DOCUMENT RESUME

ED 254 185 HE 018 181

AUTHOR	Bjork, Lars G.
TITLE	The Entrepreneurial University: A Case Study of the University of New Mexico in a Competitive Research Environment, 1972-1978.
PUB DATE	Feb 85
NOTE	116p.; For related document, see HE 018 182.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	Case Studies; Change Strategies; College Faculty; Competition; Energy; Federal Aid; *Financial Support; Fund Raising; *Government School Relationship; Higher Education; *Organizational Change; Political Influences; Public Relations; Reputation; *Research Projects; Scholarship; *State Universities
IDENTIFIERS	Ethnohistorical Approach; *Research Universities; *University of New Mexico

ABSTRACT

Factors affecting the emergence of the University of New Mexico as a research institution in a period of increased competition for research support are discussed. The case study covers the period of 1972-1978 and focuses on the development of the Office of the Vice President for Research and its entrepreneurial activities, including its increased utilization of political action, interorganizational cooperation, and the creation of an image of itself as a research university. Attention is directed to internal demands for increased support of research activities as well as competition for external support from the U.S. Energy Research and Development Administration. The institution's participation in a university consortium to manage the Los Alamos Scientific Laboratory occurred during a period when the laboratory was emerging as a significant competitor for federal energy research support. An overview of the linkages between universities and the federal government is included, along with information on the ethnohistorical approach used in collecting the data for the case study, which is designed for use in graduate student seminars. (SW)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED254185

The Entrepreneurial University: A Case Study of the University of New Mexico in a Competitive Research Environment, 1972-1978

February, 1985

Occasional Paper
National Institute of Education

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Lars G. Bjork
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Lars G. Bjork, Ph.D.
National Institute of Education
Office of Educational Research and Improvement
United States Department of Education
Washington, D.C. 20208

HE 018 181

ABSTRACT

THE ENTREPRENEURIAL UNIVERSITY: A CASE STUDY OF THE UNIVERSITY OF NEW MEXICO IN A COMPETITIVE RESEARCH ENVIRONMENT, 1972-1978

Lars G. Bjork, Ph.D.
University of New Mexico

Historically, the federal government has relied on academic institutions to conduct a substantial part of its mission-oriented research. A shift in the financial support for research from official university sponsors to the federal government had a profound effect on institutions of higher education by creating a condition of financial dependency on the federal government for the support of research. When federal funds decreased, competition intensified. The University's activities as a developing research institution are examined with respect to internal demands for increased support and competition for external support from the U.S. Energy Research and Development Administration during a "bounded" period of time, 1972-1978. The institution's participation in university consortium to manage the Los Alamos Scientific Laboratory occured during a period when the Laboratory was emerging as a significant competitor for federal energy research support. The purpose of this ethnohistorical case study is to provide a contextually rich, descriptive narrative of the establishment of the Office of the Vice President for Research and its entrepreneurial activities including its increasing utilization of political action, interorganizational cooperation, and the creation of an image of itself as a research university as part of a strategy for increasing research support in a competitive environment. This study is designed for use in graduate seminars.

Table of Contents

Page

List of Figures 1

Introduction 2

Chapter I: Linkages Between Universities and the Federal Government . . . 5

Chapter II: The External Support Environment for Research and the University's Competition for Federal Funds . . . 33

Chapter III: Methodology 91

Bibliography 109

LIST OF FIGURES

Figure Page

1 Total Expenditures of Federal Research and Development Support by Universities, 1953-1976 (Constant 1972 dollars/billions) 11

2 University of New Mexico Sponsored Research Development and Demonstration Proposals Submitted and Funded, 1958-1978 23

3 The University of New Mexico's Expenditures of Research Development and Demonstration Funds, 1956-1978 (Constant 1972 dollars/millions) 24

4 The University of New Mexico's Position in the National Science Foundation Ranking of the Top 100 Institutions in Total Federal Research and Development Obligations for FY 1972-1978 25

Introduction

Historically, the federal government has relied on academic institutions to conduct a substantial part of its mission-oriented, applied research. The relationship between the federal government and the nation's research institutions was enhanced as the federal government realized that scholarly and scientific pursuits were a significant resource available for resolving social problems, improving the economy, and strengthening national security.

The influence of the federal government on university-based research and development activities was profound. A shift in the financial support for research from official university sponsors to the federal government began during the years just prior to World War II. This shift affected the universities by creating a substantial dependency on federal support of research, focusing increased attention on scholarly research and publication, and establishing research expenditures as a proxy measure of both institutional activities and stature.

Since the early 1970's, universities that had participated in the rapid expansion in federal support for research during the previous decades have found it necessary to adapt to changing circumstances. The effects of a number of economic factors between 1968 and 1978 contributed to a no-growth or static level of federal support for university research. Combined with internal conditions of financial austerity, this contributed to a sense of uncertainty in the universities' research funding environment (Smith and Karlesky, 1977).

Universities, like many other organizations, are confronted and shaped by a combination of internal and external environmental forces that threaten their survival, stimulate adaptation, and provide opportunities for institutional growth. Those who administer institutions of higher education are faced with continually changing environments to which they must adapt. The manner in which both internal and external environments affect institutions of higher education is an area of crucial interest to university administrators. Conditions of change and uncertainty emphasize the importance of understanding the forces and factors that allow the university to maintain a strategic coalignment with its external environment.

To contribute to the development of that understanding, this case study exmaines the history of the University of New Mexico (UNM) during the period 1972-1978, when it was emerging as a research institution in a highly competitive research support environment. This study focuses primarily on the development of the Office of the Vice President for Research and the increased utilization of political action, interorganizational cooperation, and creating a new public face of the institution as a research university as part of its strategy for aggressively pursuing increased research support.

The University's activities as a research institution are examined with respect to internal demands for increased support of research activities and competition for external support from the U.S. Energy Research and Development Administration. The study reconstructs a part of UNM's contextual "environmental milieu" (Mortimer and Tierney, 1979) as it relates to federal funding for energy research during a "bounded" (Stake, 1978) period of time, 1972-1978. UNM's participation in an attempt by a university consortium to manage the Los Alamos Scientific Laboratory occured as a result of the Laboratory emerging as a significant competitor for federal energy research support.

The purpose of this study is to provide a contextually rich descriptive narrative of an institution's activities during a period of increased competition for federal research support. Chapter III, entitled "Methodology," discusses the ethnohistorical approach used in collecting the data for this case study, suggests the importance of developing a conceptual framework for analysis, and discusses both the value of developing grounded theory and the limitations of making broad generalizations from limited ranges of data. It is hoped that this case study will contribute to the development of qualitative research skills and raise further questions into this organizational phenomena.

Chapter I

Linkages Between Universities and the Federal Government

Linkages between Universities and the Federal Government

The association between science and the federal government is a unique American phenomenon (Veysey, 1963) that emphasizes linking practical public service with applied scientific research inside an academic institution. The potential of this relationship was recognized and advocated by both Franklin and Jefferson early in the nation's history (Dupree , 1957; Price, 1965; Smith and Karlesky, 1977; Veysey, 1963). The relationship between the federal government and science has proved to be mutually advantageous: government agencies accomplish their missions with the assistance of trained scientists, and the government's support of science provides a source of strength to the emergence of scientific research in institutions of higher education.

Reliance on colleges and universities for the performance of applied research has been described as modest, small, timid, and intermittent (Cowley, 1980; Dupree , 1957; Millet, 1952; Seitz, 1966). Despite such characterizations, the federal government's reliance on institutions of higher education has established an operational precedent that has greatly shaped the relationship between the federal government and universities that undertake research activities for the government.

During the American industrial revolution, government and industry began to utilize scientific research capabilities in universities. The realization "that scientific research had a natural place in the pattern of higher education in the universities" followed (Seitz, 1966, p. 4). The acceptability of such scientific research to universities contributed to the emergence of American science during the 1870s and 1880s. During this period, American colleges were influenced by the

German example and adopted a number of practices that contributed to the establishment of the American university (Nagi and Corwin, 1972). Scientific disciplines emerged and involvement in scientific research became an intrinsic function of the institutions (Seitz, 1966; Veysey, 1965). The compatibility between scientific research and higher education was viewed by both academic institutions and the federal government as an important asset in the future development of the nation (Dupree , 1957; Veysey, 1965; Wolfle, 1959). Veysey (1965) and Dupree (1957) note that during the 1890s, as the demands on federal, mission-oriented agencies increased (e.g., the Department of Agriculture), the federal government increased its utilization and support of scientific research in American universities with grants and contracts (Ben-David, 1972; Handler, 1966; Price, 1965; Rivlin, 1961). Such increases in support substantially enhanced the universities' ability to perform basic and applied research. The financial support provided by the federal government enabled the universities to assume increasing responsibility for conducting the major portion of the government's research requirements (Wolfle, 1959).

The pursuit and support of science by the federal government inside universities grew rapidly during and after World War I. Dupree (1957) and Veysey (1965) note that during the First World War, science was perceived as one among many elements contributing to the war effort. However, during the 1930s, this narrow perspective changed, and scholarly and scientific pursuits were also recognized as valuable resources in finding solutions to difficult, pressing national economic and social problems. The practice of linking applied science with practical public service developed as a dominant them in the federal government's rationale for employing and financially supporting university-based research.

The relationship of the federal government and the university research community entered a new era during the 1940s, when both the diversity and scale of research expanded substantially. The federal government accepted the major financial responsibility for the support of scientific research and for establishing what has been described as a partnership (Babbidge, 1968; Gladieux, 1976; Hornig, 1966; Smith and Karlesky, 1977), a symbiotic relationship (Nagi and Corwin, 1972), and a state of mutual dependence (Ashworth, 1972; Kidd, 1959; Price, 1965) with institutions of higher education. Corson (1975) notes that the rapid expansion of federal financial support for university-based research originated in the years just prior to World War II, when the government sought the assistance of highly-skilled faculty researchers.

During and after World War II, federally-sponsored research rapidly became a major campus activity. Federal grants and contracts became the principal means of providing support for scientific research; they were awarded on the basis of the merit of individual scholars or groups of scholars rather than to their respective institutions. Federal support for research rapidly overshadowed university resources as the primary means of funding scholarly research activities (Corson, 1975; Ford Foundation, 1978; Hornig, 1959; Kidd, 1959; Klopsteg, 1959; Smtih and Karlesky, 1977; Strickland, 1967). This shift in research support from the universities themselves to the federal government was an important issue for science. Federal support for research became a fundamental characteristic of government-university relationships during the post-War period (Dupree , 1957; Heimovicks, 1971; Murphy, 1971; Orlans, 1968). Indeed, "[I]n the process, important precedents were established for the future partnership between the government and the universities in the support of . . . research" (Smith and Karlesky, 1977, p. 13). Finn (1978) notes that the support of the federal government was directed towards accomplishing the practical public-service goals of its mission-oriented agencies rather than towards encouraging the development of the research capabilities of universities. However, as an indirect result of government support, universities did nonetheless enhance their internal research capabilities. The federal government emerged as the principal sponsor of scientific research and the universities were recognized as the locus for carrying out government research.

The massive, post-World War II, federally-sponsored research effort had a significant and lasting effect on American universities. Ben-David (1972) identifies "two waves of massive infusion of federal funds into research and development--one during World War II, and another in the fifties--as a reaction to the Soviety success with thermonuclear bombs and satellites" (p. 106). Corson (1975) notes that federal funds for the support of university-based research increased from $4 million, in current 1972 dollars,[3] in 1940-1941 to $225 million in 1945-1946 (p. 128). This substantial increase, stimulated by the war crisis, was followed by a period of immediate decline following World War II. A renewed interest in the support of university-based research in the early 1950s was stimulated by two prominent men, Dr. James B. Conant and Dr. Vannevar Bush, who, according to Millet (1952), raised their voices

---

[3] Comparative data on federal expenditures for university-based research were available only in current 1972 dollars for the years 1953, 1960, and 1968.

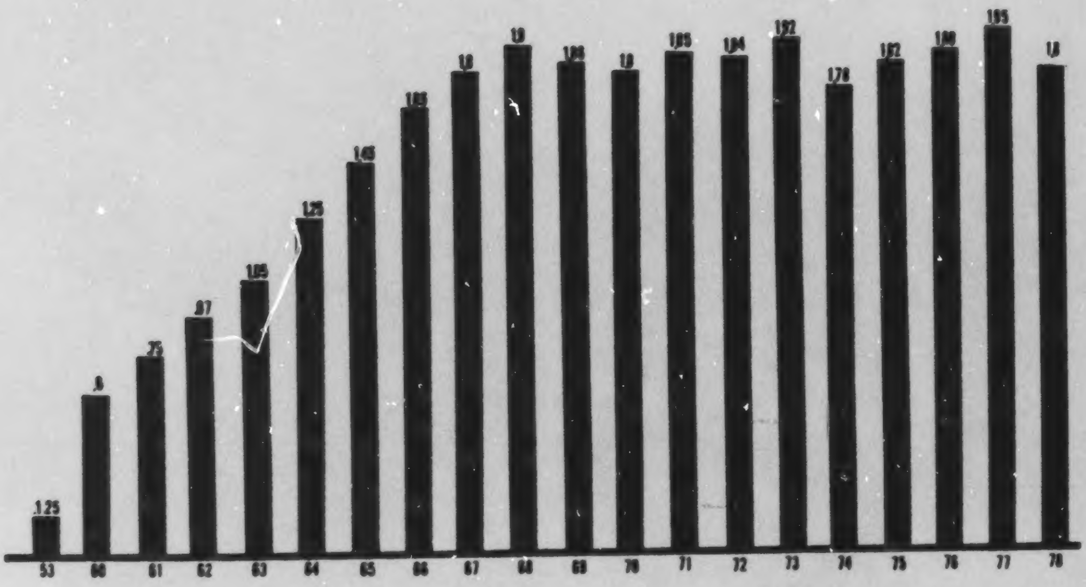
> to warn that individual scholarly research must not be allowed to disappear. [They believed] here was a vital need for the unhurried, deeply reflective scholar [and] recognized that present financial pressures upon universities [were] making his support increasingly precarious (p. 26).

In the 1950s, scientific knowledge and the strength of university research were considered major factors in the nation's survival. The renewed interest became a "spectacular expansion in the American research effort that lasted a decade" (Smith and Karlesky, 1977, p. 16). In 1953, federal expenditures for university-based research and development amounted, in current 1972 dollars, to $125 million, increased to $229 million in 1957 (Tuckman and Whalen, 1980, p. 156), and as a result of the Soviet Sputnik, rose to $600 million in 1960. It reached a peak in 1968 of $1.9 billion (Fig. 1, p. 14).

This massive infusion of federal research support to universities had several consequences: (1) attention to teaching declined as interest in research increased (Babbidge, 1968; Ben-David, 1972); (2) the central administration of universities and their departments were weakned as opportunities for individual research expanded (Ben-David, 1972; Gladieux, 1976); (3) emphasis shifted from undergraduate towards graduate education and research training (Ben-David, 1972); (4) a condition of financial dependency on federal support for research emerged (Heimovicks, 1971; Price, 1965); (5) applied, mission-oriented research, determined by the federal government, surpassed university-supported basic research; (6) new political relations between the universities and the federal government were established (Kidd, 1967; Price, 1965),

Figure 1

Total Expenditures of Federal Research and Development Support by Universities, 1953-1976 (Constant 1972 Dollars/Billions)[1]



[1] Data for this figure are based on Smith and Karlesky (1977, p. 18) and the National Science Foundation (1978, p. 2).

and (7) the manner in which research was organized, carried out, and funded within the institutions of higher education changed (Kidd, 1959; Klopsteg, 1959). Hornig (1959) notes that as a consequence of this unprecedented and massive support for scientific research, the "shape of science and the direction of scientific progress were no longer a matter for the scientific community alone" (pp. 16-17).

With the influx of federal dollars, both the shape and direction of scientific research became an important part of the public enterprise. These were directly related to the government's ability to meet national needs, for the federal government depended heavily on the strength of the nation's system of higher education and its research capabilities. Consequently, the federal government actively pursued the sponsorship of research during the 1950s and 1960s in a manner that would not only accomplish agency missions but also enhance the ability of academic institutions to perform high-quality research. There is little question that the investment of the federal government in higher education was both "large and its influence profound" (Finn, 1978, p. 1). Orlans (1962) observes that the relationship between the federal government and institutions was "on the whole decidedly beneficial" (p. 133). In 1978, The Ford Foundation recognized a need for excellence in higher education that could not be achieved without a strong partnership between the universities and the federal government. Research activities increased, becoming both broader in scope and more specialized in nature; they also became enormously more expensive and dependent on the financial support of the federal government. Such dependency made the universities vulnerable to federal reductions in financial support.

Throughout the 1950s and 1960s, universities adjusted to dramatic shifts in their external research-support environments. Since the early 1970s, universities have found it necessary to adapt to changing conditions as the effects of a number of combined economic factors force reductions in federal support for research. The decline in the national economy, financial austerity in university budgets, and the reduction in support for research by the federal government are deepening the concern of universities over budgetary instability and the health of campus research (Smith and Karlesky, 1977). This confluence of events has reduced the rate of expansion of federal support for research and development. Although "the total costs of a university's research effort," as Smith and Karlesky (1977) note, are "rarely assumed by any single force" (p. 163), it is evident that the primary source of funding for research, the federal government, exerts a powerful influence in the conduct of that activity on university campuses.

The literature on shifts in financial support for research from universities to the federal government just prior to World War II, subsequent dramatic increases in federal support, and vigorous expansion of research in universities during the 1950s and 1960s suggests that institutions of higher education adapt to these changes but become in the process dependent on the federal government for the support of research. Between 1968 and 1977, the expansion in federal support for RD&D in universities leveled off and forced institutions to adjust from the expansionary conditions of the fifties and early sixties--an era of munificent resources--to a period of uncertainty and leveling resource availability. The period between the late 1960s and the mid-1970s underscored institutional vulnerability to shifts in levels of federal support that had increased since World War II.

The growth in the transfer of federal funds to universities for research and development between 1953 and 1968 proceeded at a rapid rate, increasing fifteen times from $1.25 million to $1.9 billion (Fig. 1, p. 14). University-based research and development flourished during this period (Finn, 1978; Smith and Karlesky, 1977; Tuckman and Whalen, 1980). However, from 1968 to 1976, the combined effects of inflation, the "deemphasis on defense and space programs" (National Science Foundation, 1978, p. 8), and a shift to civilian-related, applied research caused federal support to universities to decline by an estimated 3% (Smith and Karlesky, 1977). Federal support of university research changed from one of rapid expansion to a static level of support. It was a period characterized as one of "uncertainty" (Smith and Karlesky, 1977) that "was not conducive to efficient ongoing academic research performance" (National Science Foundation, 1977, p. 14). "Particularly troubling for institutions of higher education was the decline in federal support for basic research, which in constant [1972] dollars, fell by 15 percent between 1968 and 1976" (Finn, 1978, p. 114). A modest increase from $1.85 billion in 1976 to $1.95 billion in 1977 and an estimated increase in 1978 to $2.5 billion (National Science Foundation, 1978, p. 2) were the result of an "increased emphasis on finding alternative sources of energy and recent administrations' policies to strengthen the federal basic research effort" (National Science Foundation, 1978, p. 7), "concerns by both the Ford and Carter Administrations regarding the health of this nation's R&D enterprise" (National Science Foundation, 1977).

The reduction in federal funding for university-based research during the decade between the mid-1960s and mid-1970s underscores the significant change in the federal government's concept of the relationship between the government and the universities (Smith and Karlesky, 1977). The concept of a symbiotic, patron-performer alliance was replaced by a purchaser-vendor relationship. Tight federal budgetary conditions led to an effort on the part of the federal government to connect funded research to quick results (Ford Foundation, 1978). In this new framework, universities were viewed as just one of many competing performers that could be used to support the federal government's mission-oriented agencies. Cheit (1971) describes the effect of the federal government's reduction in support for R&D and the apparent shift in its traditional relationship with universities for the conduct of research as being a "depression in higher education" (p. 139). The reduction in support and shift in the government's traditional relationship with universities were significant, contributing factors in forcing universities to adapt to changes in their external environment (Finn, 1978; Smith and Karlesky, 1977).

In the post-World War II era, massive support for R&D in universities had created a dependence on federal funds that tended, when reduced, to make institutional budgets unstable (Corson, 1975). The financial dependence of universities on federal support for R&D placed the universities in a position of vulnerability, a condition characterized by Kidd (1966) as a state of "turbulent dependency" (p. 65). The literature suggests that the fragile financial stability of university-based research budgets between 1968 and 1976 caused institutions to adapt in an attempt to maintain a state of financial stability for the support of research and to maintain equilibrium with their external environments (Emery and Trist, 1965; Katz and Kahn, 1978). Universities became increasingly involved in the political process (Kidd, 1966), directly contacting federal agency administrators, state legislators, Senators and Congressmen to mobilize support as a means of insuring the predictability and continuous flow of federal research funds. Institutions also placed an increasingly high priority on (1) reallocating internal resources; (2) adjusting their internal organizational structures; (3) establishing or enhancing offices of research to improve their competitive capabilities, and (4) establishing informal, inter-institutional linkages to improve the flow of information and to increase opportunities to participate in research (Kidd, 1959; Klopsteg, 1959).

The dramatic increase in federal support for university-based research and development between 1960 and 1968 had a profound impact on the evolution of established and developing institutions. The literature suggests that federal support stimulated the development of campus research, shaped its direction, dominated its continuance and contributed to the emergence of research as a measure of institutional stature.

The Development of the University of New Mexico in the Direction of a Research University

In the years just prior to 1968, when federal support for research and development peaked, some faculty members and administrators at the University of New Mexico noted the importance of engaging in a broad range of research, development, and demonstration activities. The Office of the Vice-President for Research and Dean of the Graduate School was established in 1968 in part as a response to the desire of some faculty members and administrators to encourage and promote research on the campus. Internal restructuring of the University's administration was carried out to redistribute the work-load of the Academic Vice-President and to promote and support research and development activities on campus. These actions symbolically recognized the importance of research internally as well as the necessity for presenting the institution externally as a research university. The importance of RD&D activity at the University of New Mexico "hadn't been addressed as well as it had in more mature institutions" (Personal interview, Travelstead, July 26, 1982). The University

> took this step as an effort to give direction and emphasis to something that we thought was important for an institution that hopes to be a great university. . . . It did say . . . to other institutions, that we were, in our evolution and growth, trying to recognize and to do more in the whole area of research (Personal interview, Travelstead, July 26, 1982).

The University adjusted its internal organizational structure and increased its external contacts in an effort to promote and facilitate RD&D activities and to assist faculty in securing resources. The data indicating these developments will be discussed in detail in the following chapter . Further, in order to facilitate the University's development in the direction of a graduate research institution, key administrators took the following steps: (1) established the Office of the Vice-President for Research and Graduate Affairs; (2) utilized the existing Office of Research Administration and Fellowship Services to facilitate and encourage increased faculty participation in research; (3) reduced faculty teaching loads to encourage more RD&D activities; (4) secured and redistributed a larger portion of the return on overhead to support RD&D resource acquisition efforts; (5) hired a Vice-President with expertise in research administration to provide leadership; (6) shifted "from a custodial to an entrepreneurial mode" (Personal interview, Kasner, May 20, 1982) in development of research support; (7) established inter-institutional linkages with other regional universities, and (8) increased contacts with State legislators, federal agency directors, and Congressional delegations.

During the 1968-1978 period, when federal funds for research leveled, the University increased its internal research support and external development activities. In Constant 1972 dollars, the University nearly doubled its total expenditures for all types of research, development, and dmmonstration activities from $6.5 million in 1968 to $12 million in 1978. A significant indicator of its success in establishing its position as a major research university was its listing by the National Science Foundation in "Total Federal Obligations to 100 Universities and Colleges receiving the Largest

Amounts, FY 1972." The University was ranked 54th in 1972 and has essentially retained that ranking between 1972 and 1978.

During the years 1968-1978, when federal support for university-based RD&D activities was at a static level, the State of New Mexico, stimulated in part by the 1973 Arab oil embargo, actively encouraged and supported university-based energy research (Personal interviews, Kasner, May 20, 1982; Perovich, July 26, 1982; Silverman, March 24, 1982). New Mexico Governor Apodaca and the State Legislature supported the use of a portion of the State's surplus funds to establish an energy-research program in New Mexico and to utilize the research capabilities in the State's universities (Personal interviews, Kasner, May 20, 1982; Silverman, March 24, 1982). During the period after 1973, the State put "a substantial amount" (Personal interview, Perovich, July 26, 1982) of money into supporting university-based research. The funds were viewed as "seed money [a means of getting] cranked up" (Personal interview, Perovich, July 26, 1982) to conduct energy research. Thus, State support and encouragement of university RD&D activities in general and energy research in particular came at a time when the University was aggressively seeking to establish and maintain itself as a research institution in a climate of static federal support.

The Office of the Vice-President for Research and the Development of Sponsored Research, 1973-1975

Dr. Paul Silverman came to the University of New Mexico in 1972 as a professor and Chair of the Department of Biology. He came from the University of Illinois, where he had been the Director of the School of Life Sciences, a senior administrative position equivalent to a deanship. As Director of the School, he was deeply involved in both research and research administration. As Dr. Travelstead noted, the "interest and experience of Paul Silverman was one of the big factors that caused people to think that he should go into the Office of the Vice-President of Research . . . he was an able man" (Personal interview, Travelstead, July 26, 1982).

Once appointed as Acting Vice-President in 1973, Dr. Silverman began to re-shape the Office of the Vice-President for Research vigorously. L. E. Roberts notes that Dr. Silverman "structured the office. He set up a viable mechanism which we still have. [He] defined the mission of the office, set up the procedures, and he set the tone for support on this campus" (Personal interview, Roberts, June 29, 1982).

Dr. Silverman noted that Dr. Heady provided a great deal of support for his research development efforts:

> there was a mood and an atmosphere that evolved because of Dr. Heady's identification that this was an important role . . . And the infrastructure that existed, that is, Jerry Kasner, and the support [of] . . . John Perovich and the intellectual support that we had from Chester Travelstead . . . [these factors] coalesced to generate a kind of trust that enabled me, I believe, to speak with a kind of confidence about the campus that enabled me to provide

> leadership . . . that otherwise I could not have done (Personal interview, Silverman, March 24, 1982).

Dr. Silverman observed:

> In that sense Ferrel Heady gave me more opportunity to devote more time to encouraging research and development. So, that in itself was an important restructuring of the position. I was able to devote far more time to establishing relationships both within the campus, finding out what was happening, encouraging developments by my interest and my awareness, then going out and meeting and selling the potentials of the institution, not only on the federal scene [and in the state] but also through an industrial affiliation program. And as an outgrowth of that was a restructuring of Jerry Kasner's role to become much more interested in encouraging faculty to engage in research, to make disclosures of patents and licenses (Personal interview, Silverman, March 24, 1982).

Faculty support was also forthcoming. According to Travelstead,

> [F]aculty in general began to take satisfaction in that this institution had taken and was continuing to take that step which did give better prestige and reputation, even though some of them, individually, did not participate in it. I think it had a good effect on the faculty . . . [and there was a] . . . general feeling that the institution had taken a good step and was making progress toward maturing as an institution by giving more attention to research (Personal interview, Travelstead, July 26, 1982).

By 1974, Dr. Heady's goal of obtaining research funding for the University from outside sources began to be realized.

The widely-believed decline in federal support for sponsored research did not have a serious impact on the University of New Mexico during the 1972-1975 period. It was during this period that the institution began instead to move more aggressively in developing its research capabilities.

Mr. Kasner observed:

> [W]e had a feeling that everyone was screaming, The sky is falling! the sky is falling! The Chicken Littles were going crazy . . . I ignored these [people] and I think Paul Silverman ignored them . . . he said to himself, that's a factory, but let's try. And that's what we did when a lot of people [in the nation] were retrenching . . . [the University of New Mexico] was going externally, it was in a marketing mode, an entrepreneurial mode, when all other universities were wringing their hands nationally. All we did was ignore the national scene and said, Look, there's only one way to do it and that is to try. And we tried. We tried hard (Personal interview, May 20, 1982).

Kasner continued:

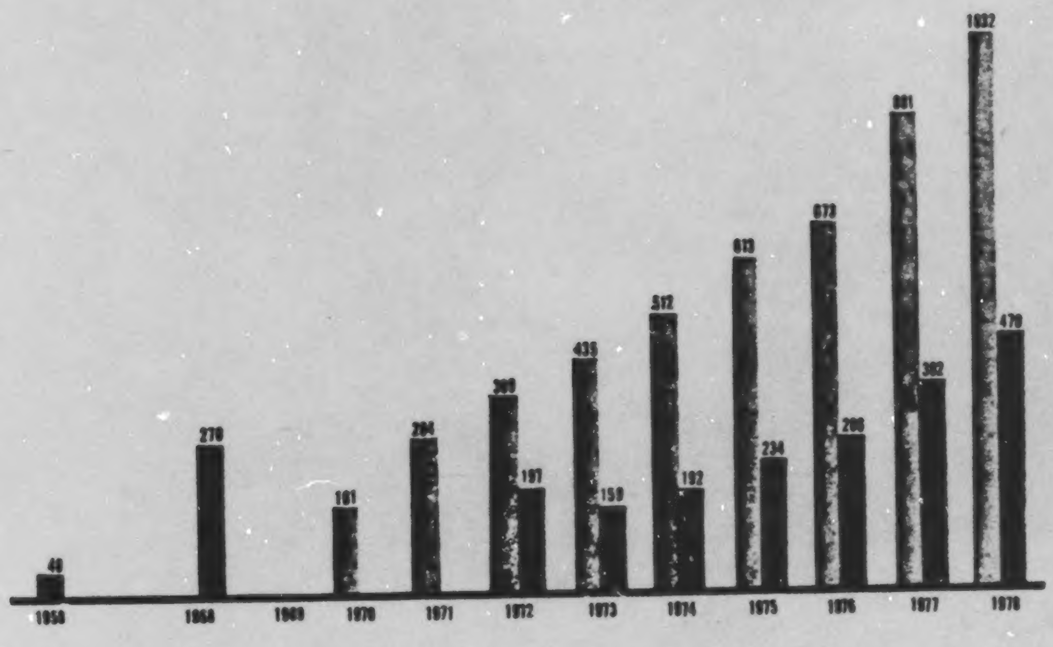
> My impression is that even when things were bad [nationally] UNM did very well because they were relatively aggressive . . . those universities which started falling down just assumed that they couldn't get what they wanted to get, and they should have been competitive (Personal interview, Kasner, May 20, 1982).

The data support this impression. For example, the number of proposals submitted by faculty increased 46% between June 1971--June 1975, from 284 proposals to 613 proposals (see Fig. 2, p. 51).

During the 1972-1975 period, when the Office of the Vice-President for Research and Graduate Programs was structured, viable support mechanisms were established and the mission of the Office was defined by Dr. Silverman. An able researcher and administrator, Dr. Silverman focused on encouraging, supporting, and developing sponsored research on campus. An aggressive research development program created considerable impact on sustaining and increasing the research momentum built up by some faculty researchers. During 1972-1975, both proposals submitted and research expenditures increased.

Figure 2

University of New Mexico Sponsored Research, Development, and Demonstration Proposals, Submitted and Funded, 1958-1978[1]



Total number of RD&D proposals submitted

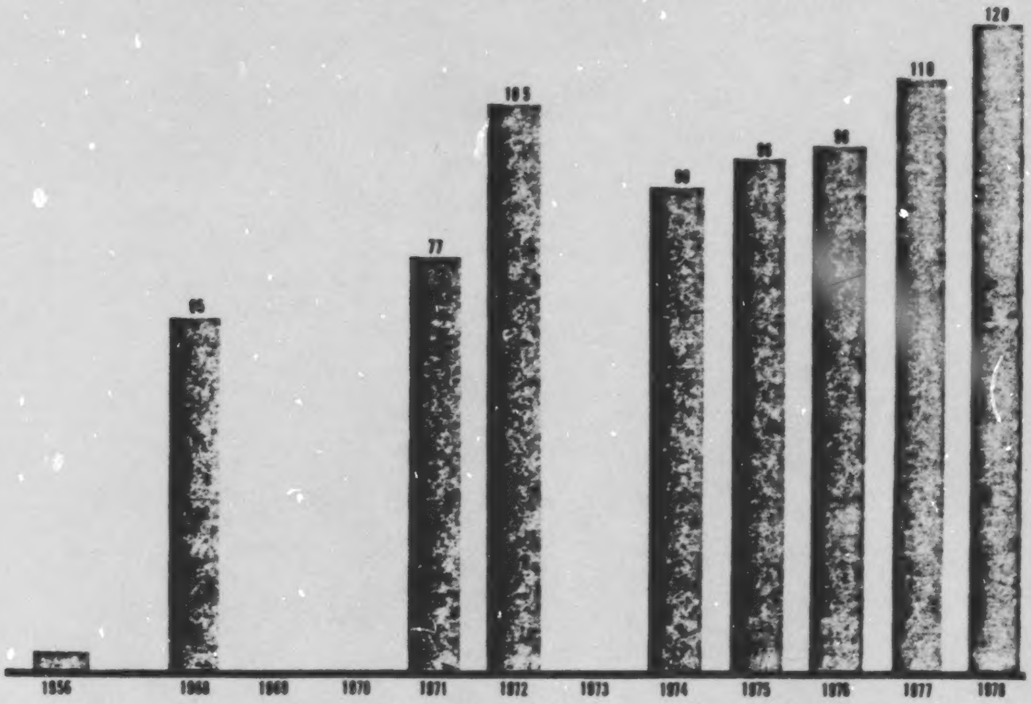
Total number of proposals funded

[1] Statistical data for 1969 not available.

The University began its efforts to increase its research activities during a period when the growth in federal research support had become static. Many research administrators nationwide perceived this situation as a decline in support. However, the University pursued the development of research on campus in an aggressive, entrepreneurial way and ignored the "prognostications of the doom-sayers" (Personal interview, Kasner, May 20, 1982). It tried hard to improve its research capabilities and to generate support. The University's expenditure of research, development, and demonstration funds (Fig.3)

Figure 3

The University of New Mexico's Expenditures[1] of Research, Development, and Demonstration Funds,[2] 1956-1978[3]



[1] Expenditures refer to total amount of research support funds spent by the institution received from State, federal, foundation, and industrial sources.

[2] The University reported expenditures of funded projects as a total amount and identified expenditures for basic research, applied research, demonstration or training programs.

[3] Data were not available for the years 1969, 1970, and 1973.

from grants and contracts increased (in constant 1972 dollars) from $7.7 million in 1971 to $9.6 million in 1975, an increase of 12.5%. During 1972-1975, when the nation experienced a period of decline or recession, the University of New Mexico secured a larger share of available research support funds than it ever had. Of these, approximately 90% of the total RD&D funds were federal, 5% were State, 3% were from business contracts, and 2% were from private foundations. In 1972, for the first time, the University was listed by the National Science Foundation in its "Total Federal Obligations to 100 Universities and Colleges receiving the largest amounts, FY 1972" (Fig. 4):

Figure 4

The University of New Mexico's Position in the National Science Foundation's Ranking of the Top 100 Institutions in Total Federal Research and Development Obligations for Fiscal 1972-1978[1]

Year	Ranking	Year	Ranking
1972	54	1976	53
1973	77	1977	49
1974	61	1978	57
1975	63		

[1] E. B. Kasner, "UNM/ORA Statistical Summary," UNM, May, 1982, Attachments 1-7.

Development of the Office of Research and Fellowship Services As a Research Support Unit

The Office of Research and Fellowship Services was established in 1957 to provide support services for research faculty. The data indicate that its first director, Harold Walker, had a "rough time of it" (Personal interview, Heady, July 19, 1982) because the Administration selected him without adequate consultation with the faculty. The faculty had a "hands-off attitude" (Personal interview, Heady, July 19, 1982) about working with him; this made his job more difficult and compromised the effectiveness of his office (Springer to Heady, March 11, 1968). Consequently, during the 1967-1969 period, when the establishment of the Office of the Vice-President for Research and Dean of the Graduate School was being discussed, the functions of the Office of Research and Fellowship Services were re-analyzed to determine what was being done and what could be done to improve research support services on campus.

Insofar as the Office of Research and Fellowship Services was responsible to the new Vice-President for Research and Dean of the Graduate School, its functions were included in the "Proposed Duties and Responsibilities of the Vice-President for Research." They included (1) providing informational services on research opportunities, (2) establishing a data bank on research, (3) issuing a research bulletin listing research proposal deadlines, new contracts and grants awarded and completed, (4) maintaining a central inventory of all current proposals for grants, contracts, and training programs,

(5) conducting occasional seminars for faculty, students, and visitors to discuss research activities, (6) reviewing research proposals and making recommendations for action by the Vice-President and Dean of the Graduate School, (7) assisting the Vice-President in identifying shifts in federal funding policy and coordinating any campus-wide actions deemed necessary and appropriate, and (8) advising and assisting faculty on the technical aspects of proposal and report writing. Collectively, these functions were intended to provide a support "service-function" (Personal interview, Perovich, July 26, 1982) to both faculty and Administration through the Office of the Vice-President for Research and Dean of the Graduate School.

During 1968-1970, the Office of Research and Fellowship Services began to organize around two major areas of responsibility--faculty research support services and support to the Vice-President for Research and Dean of the Graduate School. The Office was perceived during this period as not actively promoting and encouraging faculty research but rather as a low-key, custodial, administrative unit.

Edmund B. Kasner succeeded Harold Walker in 1970. According to Mr. Kasner, the office handled two things: research services and fellowship services. But the Office "was completely disorganized. I had to separate [research services and fellowship services] and concentrage on what was important, and that was research. The fellowships were sort of static at that time and there wasn't much I could do about it" (Personal interview, Kasner, May 20, 1982). Accordingly, Kasner focused on establishing rapport with the faculty and gaining their confidence through actively promoting and encouraging research and providing research support services. The result was that the number of proposals submitted by faculty members "started to jump almost immediately . . . I think it wasn't just I who did this . . . I think the faculty was looking for something like this" (Personal interview, Kasner, May 20, 1982). The interviews and cocuments indicate that an active outreach program was established, providing the faculty with a library of pertinent information and publications. Mr. Kasner's office also began publishing a bulletin, Research Notes, that informed faculty members of research opportunities, deadlines, and awards:

> I'm not too sure if Research Notes ever really brought . . . directly much research money in. One thing it did do, it let people know that there was an office and it was working on their behalf and that was a big thing. People got upset when they didn't see it (Personal interview, Kasner, May 20, 1982).

In addition, Mr. Kasner began a program of actively representing the University and

> making calls on various agencies and seeing the people that you have to meet by telephone anyway and getting a degree of rapport going there and then you can turn other faculty on . . . It went on from that point . . . it was a marketing-type, salesmanship-type of thing. [And]. . . every time I did go back [to Washington] I always paid a call on the Congressional delegation (Personal interview, Kasner, May 20, 1982)

To a lesser extent, Kasner also initiated and maintained similar contacts with members of the New Mexico State Legislature and State agencies. The interviews and documents indicate that the purpose of this activity was to generate information in support of faculty research as well as to represent the capacilities and image of the University as a research institution.

There was a qualitative shift in the Office of Research and Fellowship Services as a result of this more aggressive manner of carrying out the responsibilities of the director. The interviews and documents indicate that because of the active research support services for faculty members under Kasner, the active representation of the University's research capabilities, and the improved information services, "the first year [1970] had . . . 161 proposals, the next year [1971] we jumped that 76%, and there was never a negative figure after that" (Personal interview, Kasner, May 20, 1982). (See Fig. 2, p. 50.). The faculty responded to the new entrepreneurial and support programs "well . . . The emphasis started to shift in . . . 1970 . . . it worked very well . . . even when there were . . . very, very tight times" (Personal interview, Kasner, May 20, 1982).

During 1972-1975, the University engaged a new Vice-President for Research, a new Director of Research and Fellowship Services, and a new Dean of the Graduate School. It encouraged faculty to increase their participation in sponsored research and established a responsive internal faculty research support system. The data indicate that the contribution made by both the faculty and the Administration in moving toward identifying the University as a research institution during 1967-1971 were significant. These early developments set the stage for the University's research development efforts in 1972-1978.

Summary

In 1968, some faculty members and individual administrators at the University of New Mexico recognized the need for expanded research support services. Research appeared to be of growing importance to institutional expansion and excellence. Dr. Ferrel Heady became President in 1968 and provided the administrative leadership needed to establish the Office of the Vice-President for Research. The Office was a symbolic statement of the emerging importance of research and graduate education on campus; it enabled the University for the first time to focus on research. The initial efforts of the first Vice-President for Research and Dean of the Graduate School, Dr. Springer, were directed toward defining the role of that Office and providing adequate logistical support and grant information to faculty researchers. The Office of Research Administration and Fellowship Services was developed to provide that support. Several key administrators in the University's central Administration supported the institution's shift in emphasis from faculty teaching toward a combination of teaching and research. They petitioned the New Mexico State Legislature (1) to allow the University to retain a portion of the overhead charged to research and development contracts and grants for discretionary use, (2) to permit a selective reduction in teaching loads for faculty researchers, and (3) to return overhead to University departments in order to stimulate additional research activities. These requests granted, in 1968 the University succeeded in increasing its faculty research activities during a period when the growth of federal support for research had come to a virtual stand-still.

In 1972, Dr. Paul Silverman became the acting Vice-President for Research. The acting Dean of the Graduate School, Dr. David T. Benedetti, reported directly to Dr. Silverman. This re-structuring had a significant impact on the Office. Silverman established viable faculty research support mechanisms, defined the Office's mission, and concentrated on encouraging and developing sponsored research on campus. The combined efforts of Dr. Silverman and Mr. Kasner established an aggressive, entrepreneurial research development program; this in turn increased the momentum of faculty research. Between 1972-1975, the number of faculty research proposals increased, expenditures for research increased, and the University was listed for the first time (1972-1978) by the National Science Foundation as one of the top one hundred universities and colleges in amount of federal support for research and development. The growth in research activities was accomplished within the context of a nationwide leveling-off of federal support for university research. The

University of New Mexico's efforts to increase its research activities were clearly successful.

Chapter II

The External Support Environment for Research and the University's Competition for Federal Funds

Introduction

This chapter will review the University's attempt to establish itself as a research institution by pursuing external funding more actively. The initial sections will briefly describe the University's resarch development efforts at the intra-state, multi-state, and national levels, as well as its efforts to establish informal linkages with other regional institutions. The following sections will briefly describe several important national events, concerns, and research development efforts that affected the University's ability to compete for research support in its external environment. In particular, the overview of events presented here will focus on the University's efforts to compete for research-support funds appropriated by Congress to ERDA.[1] An understanding of this milieu is crucial to understanding the significance of events as they are presented chronologically in the later sections of the chapter.

Regional Inter-institutional Cooperation: The Intermountain University Research Administrators and Multi-State Research Development

During 1972-1975, when the University was establishing itself as a more aggressive research institution, it began to affiliate itself informally with other regional and High Plains universities that shared common research interests. In 1973, a group of Vice-Presidents for Research in Rocky Mountain region universities, including Dr. Paul Silverman from the University of New Mexico, was brought together by the Vice-President for Research at the University of Utah to discuss areas of common research interest. In 1975, this group became an informal association of university vice-presidents called the Intermountain University Research Administrators (IMURA). The nineteen institutions cooperated on a number of objectives: to exchange information concerning federal research policy; to strengthen the relationships between federal agencies and regional universities; to improve their respective competitive positions in securing federal research funds, and to influence Congressional delegations and federal agencies to support budget increases and programs affecting the region's university-based research. The University of New Mexico's involvement in IMURA also had a less tangible benefit; as Dr. Travelstead noted,

---

[1] The U.S. Energy Research and Development Administration, hereafter referred to as ERDA.

> I think it did say, among other things, to other institutions, that we were, in our evolution and growth, trying to recognize and do more in this whole area of research . . . I'm sure it helped the image of the institution [that we were] . . . interested and supportive of research (Personal interview, Travelstead, July 26, 1982).

Among the several areas of concern that formed the basis for cooperation among these regional universities was the developing federal research-agenda that resulted from the 1973 Arab Oil Embargo. As Silverman recalled,

> [A] number of developments . . . leading in the direction of alternate sources of energy and [we also saw that those federal agencies] . . . were depending, in many ways, on what we could see to be institutions and regions that are already well supplied and connected with the Washington establishment . . . We saw our main competition from areas like Boston [and large research universities like] MIT . . . and California. And, in fact, they . . . largely populated the programs in the agencies with their own people, so they had direct connections . . . some of these people . . . were on the Cabinet like Harold Brown . . . We, being in the hinterland, did not have a natural connection and our constituency was very limited in terms of our relationship

> with Washington, in the 'megabuck' area or politically . . . We were concerned that the energy money which seemed . . . to us, at that time, a major source, [was] going to be flowing through those existing channels (Personal interview, Silverman, March 24, 1982).

The 1973 Arab oil embargo focused attention on the Rocky Mountain region's natural wealth as well as on the impact that would come with massive extraction efforts. With national energy-investment and government interests turning to the area, IMURA became more active and more mutually supportive. The Energy Research Development Act of 1974 underlined the importance of the Rocky Mountain region in establishing the nation's energy independence. The emerging competition for these funds underscored the disadvantages regional universities had in competing for research funds against established research universities on the East and West coasts.

There was a general agreement on directions in research development among the members of IMURA because the majority of the institutions represented were in similar stages of institutional development, particularly with respect to research: most were in competitive, entrepreneurial modes. This coincidence of views was most pronounced among Dr. Olson of Colorado State University, Dr. Meyer of the University of Wyoming, and Dr. Silverman of the University of New Mexico. They "were the three movers on that group that pulled [it] together . . . [These were the] three people who really generated the kind of steam that was necessary to get this thing going" (Personal interview, Silverman, March 24, 1982). There was a feeling among the members of IMURA, particularly among these three, "that what we could do to enhance the region would help us all" (Personal interview, Silverman, March 24, 1982). In a unique spirit of cooperation, those institutions that were in competition for research support also collaborated to improve their collective competitive positions in pursuit of federal research support. Dr. Silverman observed:

> You know, you are talking about people who are looking beyond their noses and who had a sense of a larger game that was being played. And we felt, as a result of our experiences, that if we did not cooperate in some reasonableness, we didn't stand a chance in the competition effort (Personal interview, Silverman, March 24, 1982).

Thus the focus of the IMURA group was competition on a national scale for access to resources at a regional level. Kasner observed:

> When Paul [Silverman] first came in, one of his big gripes was the fact that the Rocky Mountain West was receiving short shrift from the National Science Foundation . . . they said, no, it's not true. [But] . . . he did his own surveys and found out that there was a geographical pattern. All [of the research seemed to be] . . . centered in the Northeast or the West Coast with . . . a little bit in the Southeast (Personal interview, Kasner, Mary 20, 1982).

The IMURA group saw most of the federal resources for support of research being divided between the West and East coasts. Members of IMURA felt that to protect their interests in research support, they would have to increase the visibility of regional research capabilities and bring collective pressures to bear in order to ensure federal division of research support that would include grants to universities in the Rocky Mountain states. In brief, the IMURA group became a forum for ideas, access to federal agencies, information, and mutual institutional support.

Intra-State University Research Development

The more aggressive research development position taken by the Vice-President for Research and the Director of the Office of Research and Fellowship Services during 1973-1975[1] included several strategies directed at securing support from the State of New Mexico.

After the 1973 Arab oil embargo, interest in energy-resource development increased substantially in New Mexico. The University participated in an intr-state research development plan to apply the research capabilities of New Mexico universities to the national energy crisis. According to Silverman,

> We convinced [Governor] Apodaca, at that time, to use some of the severance tax money to set up our own state [research] capacity so that we could begin to build up Socorro, Las Cruces, [and] Albuquerque in a way that would increase our visibility . . . The intra-state developments which have come to fruition have been reasonably well-supported by the State . . . we certainly got the Governor [Apodaca] behind us very strongly . . . Jack O'Leary was brought in . . . he was very important politically . . . [He was instrumental in setting up the structure for the] New Mexico Energy Institute and the [Energy] Information System. We worked with the Legislature to get support for that . . . I think we did very well on that . . . We came away with a good deal of support. We did that by cooperating internally in the state . . . It was a collective effort internally . . . It was appropriate that we should [work with other State institutions and the Legislature] because we, indeed, were seen, and are, public institutions and as an arm of the State government. And we were responding to the needs of [the State] and we were trying to be as sensitive as we could to those. We provided information, we provided programmatic goals that were politically useful and sexy but also meaningful. When we got in federal funds for demonstration projects and that sort of thing, we made sure that the political representatives and others were well-aware of what we were trying to do. It was a matter of communication and information more than anything else (Personal interview, Silverman, March 24, 1982).

The intra-state plan for development of research support was an important element in the development of university-based research capabilities in the state and, more particularly, inside the University. Kasner noted that Dr. Silverman "was one of the progenitors of getting the money down to the universities. . . He planted the seeds for it, and Governor [Apodaca]. . . was supportive" (Personal interview, Kasner, May 20, 1982). Beginning in 1975, approximately $1 million a year were appropriated by the New Mexico State Legislature to support the energy research program in state universities. The programs were organized and administered by the Governor's Office. The University

---

[1] The official name of the Vice-President for Research changed in March, 1974 to the Vice-President for Research and Graduate Affairs.

> worked with whatever they [the State] called it. They changed the name three or four times, the energy office that the Governor had. It finally ended up being a department. We had to work through them, for the most part, because they demanded it. The Legislature was pooling all of its energy support into this department for the purpose of spreading it out into research areas (Personal interview, Kasner, May 20, 1982).

Kasner noted that each state university had its own research program and "quite a bit of research was done. Some of it was of an applied nature and some of a very pure, basic nature" (Personal interview, Kasner, May 20, 1982). The University of New Mexico Energy Institute and the New Mexico Energy Research Information were the products of the University's research program. According to Perovich,

> a lot of people have looked at it as a means for New Mexico to get cranked up, sort of get a leg up in that area . . . build up some expertise so that when the feds got here, we'd be in position to do a lot of that effort for them. I really feel that both the State and the institutions looked at that as seed money . . . getting geared up [to do] . . . something that was sort of indigenous to the area and very beneficial to the State or to the Southwest (Personal interview, Perovich, July 26, 1982).

Although the State of New Mexico did provide support for the University's energy-related research programs, "when Tom Shishman became director of The New Mexico Energy Institute . . . he went national on it in a pretty big way. He was bringing more money in from national sources than he was getting from the State" (Personal interview, Kasner, May 20, 1982).

The Vice-President for Research and the Director of the Office of Research and Fellowship Services initiated a more aggressive research development effort beginning in 1973. The intra-state research development program increased the amount of political contact that Dr. Silverman and Mr. Kasner had with New Mexico state legislators and directors of State agencies. However, Kasner observed, "I don't know how much help it did to the individual P.I. [Principal Investigator] at the State level. Most of those guys seemed to know pretty much where to go, anyway" (Personal interview, Kasner, May 20, 1982).

Research Development at the National Level

The federal government was viewed by the University as the major source of research support, so it was the principal focus of the institution's initiatives in aggressively pursuing research dollars. The data suggest that Dr. Silverman was aware that the University had limited political contacts within the New Mexico Congressional delegation and with administrators of federal funding agencies in Washington. Consequently, Dr. Silverman, as part of an aggressive research-development program, began to increase the visibility of the University's research potential by increasing contacts with administrators in federal agencies and among members of the State's Congressional delegation.

The National Energy Crisis and the Creation of the Energy Research and Development Administration

The national energy crisis brought on by the 1973 Arab oil embargo and the subsequent Congressional enactment of the Energy Reorganization Act of 1974 brought the Rocky Mountain region's energy reserves and research capabilities into sharp focus when plans for "energy self-sufficiency" were developed.

The Energy Research and Development Administration (ERDA) was created by the Energy Reorganization Act of 1974 and was charged "with the responsibility for developing or increasing the efficiency and reliability of all energy sources" ("Synopsis of the LASL Management Project," UNM, 1977, p. 3). Further, ERDA was to assist the nation in becoming energy self-sufficient through diverse, wide-ranging and ambitious programs in energy research, development, and demonstration. These objectives were to be accomplished as quickly as possible in order to avoid severe economic and social dislocations nationwide. In January, 1975, ERDA came into existence. In the process, it absorbed the former Atomic Energy Commission, the United States Bureau of Mines, and other federal energy-related programs.

ERDA's mission effectively translated into a substantial energy research and development effort. ERDA planned to involve universities in a number of significant ways in the planned research and development programs.

In June, 1975, ERDA published National Plan for Energy Development and Demonstration--ERDA 48, which indicated that ERDA would contract for a substantial number of research programs, encourage joint research and development projects, including the management of government facilities, coordinate energy research and development efforts with the private sector and with universities, and solicit planning assistance from regional groups (ERDA, 1975). Following the publication of its national plan, ERDA convened a two-day meeting in November, 1975, to solicit university participation in its research efforts. At this conference, Dr. Robert Seamans, Jr., ERDA Administrator, said that "ERDA [would] deal with the universities as professional partners in the overall national energy research and development effort" ("A Summary: Western Universities Propose To Manage Los Alamost Scientific Laboratory," UNM, 1977, p. 5).

According to Dr. Silverman, Dr. Seaman's statement was viewed at the University of New Mexico as an indication that universities would play an important part in ERDA's effort to pursue the goal of energy independence for the nation. It was taken with utmost seriousness by those attending the conference.

ERDA Research and University Competition with LASL

The Los Alamos Scientific Laboratory (LASL) took an active interest in participating in ERDA's emerging research and development program. Mr. Milton E. Jenkins, a former LASL employee, has stated that LASL "had an active public-relations effort for a time both to make the Laboratory appear as [an] energy laboratory . . . and to give a regional tone to it" (Personal interview, Jenkins, July 16, 1982). The data suggest that the post-1973 period, including the years following the establishment of ERDA (1975-1976) was a period when Los Alamos saw and took the opportunity of altering the mix of what it was doing from weaponry to peacetime kinds of research.

Dr. Harold Agnew, Director of the Los Alamos Scientific Laboratory, commented that LASL was making a significant shift from nuclear weapons to energy research. According to Dr. Agnew, if LASL's proposal for the National Security and Resources Center were approved by ERDA, LASL would be "a vital facility for Los Aalmos and the nation [and would become] . . . a world center for research and development aimed at solving the energy problem" (Albuquerque Journal, June 11, 1973, p. B-2).

LASL's apparent move into energy research concerned Dr. Silverman. He contacted Dr. Freeman, who was responsible for drafting the 1974 bill creating ERDA, to discuss LASL's past failure to establish research relationships with regional universities. At this stage, Silverman saw indications that LASL would play a prominent role in conducting energy research in the region. It appeared to Dr. Silverman that regional universities with substantial existing research capacities would enjoy a less-than-favorable position in competing with LASL for energy research support. Silverman observed that LASL's expansion into energy research and failure to relate in any meaningful way to the university structure in the region placed the laboratory in direct competition with the universities for ERDA research funds.

Dr. Silverman observed that LASL's shift into energy "began to affect us within the Rocky Mountain states . . . in a big way . . . Los Alamos described itself as a regional energy laboratory . . . that [had] 55% to 56% of [its] budget in non-defense related work" (Personal interview, Silverman, March 24, 1982). He cited Dr. Agnew's statements on the portion of LASL's budget that was committed to non-weapons and energy research, noting that they raised concerns at the University. Dr. Agnew commented in 1975,

> At the present time over half of its [LASL's] operations are in support of non-weapon R&D of which the energy component, both nuclear and non-nuclear, is the most rapidly-increasing fraction. We look forward to a continuation of this trend and to our contributing in a major way to the new and expanded mission of ERDA (The LASL Programs and Capabilities, LASL, 1975, p. iii).

LASL's diversification and expansion into the area of non-nuclear weapons and energy research created a demand for an expanded research staff at LASL: in 1974, Agnew stated, "I think our problem today is getting the staff that we're going to need to accomplish these programs in an area where others are competing for very good people on a very short time scale" (The Atom, March-April 1974, p. 9). In many instances, the Los Alamos Scientific Laboratory sought out highly-qualified researchers who were associated with the region's universities. Kasner noted:

> Los Alamos got . . . the producers, no question about that. They recognized who were the producers. They were smart. [LASL hired university researchers] away that were in a competitive mode . . . and . . . the University [lost in] the competition . . . They nabbed good people from universities. . . They even took the Dean of the School of Engineering . . . Dick Dove. A fine mechanical engineer . . . it did reduce the University's opportunity for competition for the same buck (Personal interview, Kasner, May 20, 1982).

Dr. Silverman was concerned that "Sandia and Los Alamos were beginning to move . . . into all the areas that previously they did not engage and which have been very largely the area in which we, at the University, were competing. That was our major problem" (Personal interview, Silverman, March 24, 1982). Dr. Silverman and Mr. Kasner were particularly sensitive to the advantages that LASL and other established ERDA contractors had with regard to securing research funds through the "Form 189" route, an exclusive prerogative of established ERDA contractors for procuring funds that effectively removed LASL from the competitive-bid process. "Form 189" enabled ERDA contractors to secure research funds for a wide range of projects under circumstances that were not available to non-ERDA contractors. It was a route restricted to "insiders."

The "Form 189" process had been a significant and unremediated issue among the regional universities and the Atomic Energy Commission --and later ERDA--for a considerable length of time. The University felt that it was "being aced out . . . limited in our ability to respond" (Personal interview, Silverman, March 24, 1982). "There was a sense of competition [and] . . . the sense that . . . [LASL] were literally setting up a research university" (Personal interview, Silverman, March 24, 1982).

Thus, for a number of reasons, Dr. Silverman and Mr. Kasner were concerned with the implications of LASL's emergence as an energy research laboratory. LASL's competition with the University for research support, its proselytizing of University faculty members, and the resulting reduction of the institution's capacity to compete effectively in certain research areas became critical problems.

Throughout late 1975, the optimism of Dr. Silverman and Mr. Kasner about the University's participation in ERDA research programs was mixed with a sense that they were getting "very short shrift in that whole thing" (Personal interview, Kasner, May 20, 1982). However, encouraged by ERDA's initial policy statements, they began to work towards establishing formal relationships with ERDA so that the University could directly participate in and contribute to the government's research efforts.

In December, 1975, a group of Rocky Mountain university research administrators was invited to ERDA's Washington headquarters to discuss a number of possible regional university relationships that could be established among ERDA, regional universities, and regional coordinating agencies. Those attending this meeting included Dr. Seamans, ERDA Administrator, Dr. R. Romatowski, ERDA Assistant Administrator for Administration and University relations, Dr. E. G. Meyer, Vice-President for Research, University of Wyoming, Mr. Mike Ansem, Federation of Rocky Mountain States, Dr. Robert Fri, ERDA Deputy Administration, Dr. Michael Yarymovich, ERDA Assistant Administrator for Field Operations, Dr. William Partridge, Vice-President for Research, University of Utah, Dean Peterson, Vice-President for Research, Utah State University, and Dr. Paul Silverman, Vice-President for Research and Graduate Affairs ,University of New Mexico. This group recognized that the impact of the national energy crises on Western states was potentially enormous. The vast scale of the proposed development of regional energy resources , the potential impact on the quality of life, and the need to solve difficult problems caused them to be sensitive to how these resources would be exploited.

The discussion between ERDA officials and regional university research administrators covered (1) the scope of ERDA's contemplated research program; (2) ERDA's utilization of regional university research capabilities through traditional application and peer processes; (3) the establishment of the Los Alamos Scientific Laboratory as a regional energy laboratory; (4) the University of California LASL management-contract renewal; (5) the interest of a group of regional universities in managing LASL, and (6) ERDA's decentralization program and plan to establish an office in Denver for facilitating

ERDA's research programs with universities, ERDA laboratories, and industry in the Rocky Mountain region.

In this meeting, Dr. Seamans stated:

> Universities can, indeed, play an important role for public sector policy makers and for the general public in providing a strong technical base for energy research and development. It is, therefore, my hope and expectation . . . that we will see increased ties between the agency and our colleges and universities in . . . energy research ("ERDA-University Conference Proceedings," ERDA, December 1975, p. iii).

However, Dr. Silverman noted:

> I got a couple of mixed signals . . . I remember meeting with the head of the NSF [National Science Foundation]. We were talking about the role of the universities . . . when I began to press him on the role of universities, he said, "Look! Paul, I'll show you something." He pulled out a list and he said, "There [is] a list of 35 universities." He said, "This is the list of universities with which we're now doing 60-70% of our business and we expect to be doing 90 or 95% with those universities [in the future]." That's what we're talking about (Personal interview, Silverman, March 24, 1982).

The universities on that list were predominantly prestigious, established research universities located on the East and West coasts with a long history of government contracts and solid connections with the Washington research establishment.

Dr. Silverman's meeting with the head of the National Science Foundation contradicted much of what was said in the ERDA meeting. Silverman observed that ERDA's statement about utilizing universities in its research program was "elusive, it was not real, [it was] illusionary . . . They [ERDA] really hadn't intended that" (Personal interview, Silverman, March 24, 1982). Dr. Silverman came away from his November and December, 1975, meetings with ERDA and NSF officials with "mixed signals." The uncertainty about the role of the Rocky Mountain universities in participating in ERDA's energy research program, LASL's past failure to work with regional universities, and LASL's move into a competitive position with the regional universities foreshadowed a far more reduced participation than regional university administrators had expected.

ERDA's Reliance on Its National Laboratories

The ERDA meetings in November and December, 1975, made it increasingly evident that ERDA would rely most heavily on its existing system of national laboratories to get its program for energy self-sufficiency moving. ERDA was under pressure to get immediate results in achieving energy self-sufficiency. Grant observes that "it was a matter of knowing the capabilities and past performances of the laboratory. They had a known entity they felt could produce on a short-term work schedule" (Personal interview, Grant, August 17, 1982). Jenkins observed: "It was my feeling that ERDA was under great pressure to get going on some of these programs and, frankly, [they were] . . . required to turn to their national laboratories. They really had no alternative" (Personal interview, Jenkins, July 16, 1982). John Walsh (1977) commented:

> ERDA's rationale for its initial heavy reliance on its own laboratories is indicated in a General Accounting Office report on management and funding aspects of three nonnuclear projects which were undertaken at the request of Senator Frank Church (D-Idaho), Chairman of a Committee on Natural Resources and Energy subcommittee, GAO reported that ERDA officials said they made extensive use of agency laboratories because of their unique capabilities and experience; because of the labs' responsiveness to ERDA headquarters direction and control, because of the pressure of time in the emergency atmosphere of the energy crisis, and because of the laboratories' willingness to make substantial use of outside contractors (p. 743).

Kasner noted that "[i]t became very apparent right off that they weren't going to use universities because universities do basic research. They wanted an instant answer for energy self-sufficiency . . . The quick fix" (Personal interview, Kasner, May 20, 1982).

In January, 1976, ERDA published a position statement concerning the co-existence of its national energy research and development activities and its military commitments in the national weapons laboratories. ERDA had inherited the Atomic Energy Commission's commitment to develop nuclear power plants for naval vessels, nuclear weapons, and other defense-related activities. ERDA attempted to establish viable ground rules for continuing these essential programs while drawing on the same laboratories for support of energy research and development. Many LASL operations that were directly related to energy also had military applications, making them difficult to classify; in fact, many research programs that were classified as energy-related were recognized by the universities as the same efforts that had previously been classified as weapons research. The interview and document data suggest that the university administrators felt that a research project could be classified as weapon or energy-related as a matter of convenience, depending on which aspect of ERDA's research and development efforts the agency needed to emphasize or de-emphasize. The shift in percentages of LASL's program budgets that were non-weapon or energy-related was dramatic, as evidenced by LASL's emergence as a leading energy-research laboratory between 1972-1976.

The key facilities for ERDA's energy and military research programs were eight national multi-purpose weapons laboratories, including LASL. ERDA's policies on the coexistence of military and energy research in these facilities read:

> the weapons laboratories can and should play a role in energy R&D. The administration [will] ensure that weapons and energy development programs do not interfere with one another . . . the non-weapons defense-related programs within ERDA differ substantially from the weapons programs . . . their civilian and military aspects are almost indistinguishable. The energy aspects . . . are increasing rapidly, but not to the detriment of weapon material production (ERDA 97-A, 1975, p. 47).

The differences between what was classified as military and what was classified as energy research would become a significant issue within ERDA; externally, it affected ERDA's relationship with regional universities.

The Intermountain University Research Administrators (IMURA) held ints March, 1976, meeting at the University of New Mexico and discussed university participation in energy research. Representatives of ERDA attended that meeting. Several possible relationships that were discussed earlier between the university representatives and ERDA staff at the December, 1975, meeting at ERDA Headquarters were reviewed. These discussions included the possibility of turning over the management of LASL to a consortium of regional universities. Dr. Paul Silverman, Vice-President for Research and Graduate Affairs at the University of New Mexico, Dr. Gerald Meyer, Vice-President for Research at the University of Wyoming, and Dr. George Olson, Vice-President for Research at the University of Colorado emerged as the three principal advocates of an IMURA take-over of LASL. Kasner observed:

> I think it was a situation of opportunism, to tell the truth . . . All these things seemed to coalesce at one time, but it was a Paul Silverman thing more than anything else . . . He [disliked] . . . the way they LASL were treating universities. His forum . . . happened to be

> the people who were in IMURA . . . They were all Vice-Presidents in the Rocky Mountain area, but his big thing was that the contract was coming up for renewal and [he] saw in that contract something that just infuriated him. And that was that for [34] years there was no competition for it. He said, we are in New Mexico, seventy miles away. Why should it be with California? Then there were the bucks, the indirect costs and what have you . . . I think it was primarily his urgings, suggestions, that everyone in IMURA got involved in it . . . So, I think Paul Silverman motivated the effort (Personal interview, Kasner, May 20, 1982).

Kasner also noted that there seemed to be a consensus among the members of IMURA to support the effort and, although " i t was Silverman's idea . . . immediately, Olson and Meyer picked up on it because they were both entrepreneurs and they went charging ahead, which didn't seem to bother Paul at all. He just wanted to see something going" (Personal interview, Kasner, May 20, 1982). In the "A Summary: Western Universities Propose to Manage Los Alamos Scientific Laboratory" (UNM, 1977), Dr. Silverman noted the concerns of the regional universities:

> ERDA spokesmen have acknowledged that the non-technical problems of energy development may prove to be more difficult to resolve than the purely scientific and technical problems. ERDA's overtures to the nation's universities confirm that ERDA expects the universities to become deeply engaged in solving the scientific, technical, and social problems that will lead to successful and acceptable new commercial energy developments.
>
> This interest is certainly mutual. The universities of the underdeveloped western states . . . possess many well-developed capabilities in the social sciences as well as in mathematics, physics, chemistry, biology and computer sciences, and in specialties within these fields relating directly to energy research and development. These regional universities expect to participate as full partners with ERDA in energy-related research in these basic scientific fields, engineering, and social sciences.
>
> For most of the past 33 years LASL, although located in the underdeveloped western states region, has had a national

> role as a multi purpose weapons laboratory and as a center for advanced scientific research . . . But until recently LASL has developed virtually no distinctively regional interests or character. It has remained a national laboratory in a regional setting. Under those conditions LASL's continuing management from outside the region, by the University of California, presents no significant regional issue.
>
> In recent years, however, the balance and emphasis of LASL research interests have broadened markedly to include increasing proportions of non-weapons defense work and non-defense energy-related and basic research. This expansion of non-weapons research has attracted the interest and limited individual participation of nearby regional universities, who began to view LASL as a key regional research center, in addition to its continuing national role ("Synopsis of the LASL Management Project," UNM, 1976, pp. 8-9).

Dr. Silverman further noted:

> At that time we became aware that the contract for LASL was up and they were no longer doing a majority of their work [in weapons] . . . and it was . . . on that basis that we went forward to try to seek the contract for Los Alamos so we could do that which we felt we ought to be doing as a cooperating group in the same way Argonne Laboratories, Oak Ridge, [and] Brookhaven . . . National Laboratories were being governed, monitored, and directed by consortia of institutions that have direct relevance to the region in which they are operating. Los Alamos described itself as a regional laboratory. So we felt, great! Glad to have you! Let's work together (Personal interview, Silverman, March 24, 1982).

At the April 15, 1976, meeting of IMURA in Albuquerque, Dr. Liverman, ERDA Assistant Administrator for Environmental Safety, Dr. Richard E. Taschek, Associate Director for Research at LASL, Dr. Walter G. Belter, Biomedical Environmental Research, LASL, and Dr. Edward F. Hammel, Assistant Director for Energy at LASL met with the representatives of the regional universities to

> discuss . . . the function and roles of LASL and the universities in the region, interface problems between LASL and the universities in the region, ERDA interfacing with state governments and the general thrust of the ERDA energy programs . . . The main reason for [this] visit will be to explore means by which the national laboratories and the universities can cooperate in solving the energy related social, environmental, health and economic problems of the

> region (W. S. Partridge, to members of IMURA, March 9, 1976).

On May 10, 1976, Dr. Silverman received a letter from Dr. Liverman, ERDA's Assistant Administrator for Environmental Safety, which suggested that ERDA, LASL and the regional universities

> should be able to establish a firm basis for your involvement jointly with us . . . to help come to a full realization of our programs to provide energy for the country. As a result of these dialogues, we should be able to establish cooperative programs aimed at solving energ-related problems in the intermountain region [but need] . . . to follow up with the Los Alamos group in the near future to explore broader mechanisms for cooperation and collaboration (Liverman to Silverman, May 10, 1976).

The universities' position was that (1) they would accept ERDA's statements regarding the involvement of universities in their research program at face-value; (2) they were convinced that LASL was emerging as an important regional energy-research facility, and (3) they wanted to establish a functional role for the universities within LASL's energy-research program rather than continue under conditions that gave LASL a decidedly unfair competitive advantage.

On May 17, 1976, ERDA held a Western regional meeting in Denver, Colorado. The meeting included representatives of regional universities and energy-coordinating agencies.

> Dr. Paul Silverman and Mr. E. B. Kasner of the University of New Mexico and Dr. E. Gerald Meyer of the University of Wyoming attended a meeting in Denver, Colorado, at which a number of ERDA officials were present. The three university representatives participated in a luncheon discussion with Dr. Michael Yarymovych, ERDA's Assistant Administrator for Field Operations, and Dr. Herman Roser, Manager of ERDA's Albuquerque Operations Office [ALOO]. The university personnel raised the question of submitting a proposal to undertake management of LASL when the contract was renewed in 1977.

> The ERDA representatives indicated that a review of contractor performance was in progress within ERDA as a step toward renewing the existing contract, but Dr. Roser stated that there was still time for the universities to submit a competing proposal if they acted quickly. Yarymovych requested Roser to supply the universities with some background information to assist them in preparing the proposal ("Synopsis of the LASL Management Project," UNM, 1976, p. 4).

ERDA's response was encouraging; it gave the university representatives a clear message that the long practice of non-competitive contract procurement and renewal would now be opened for competitive bid.

Several other developments within ERDA were discussed during the May 17, 1976 meeting. They, too, suggested the direction ERDA would take in pursuit of its future research program. The agency announced that it would establish regional offices in Denver and San Francisco to facilitate ERDA's working relationship with its laboratories, government agencies and universities, and industry.

During the same meeting, LASL presented its plan, outlined in R. E. Malenfant's "Proposals for Implementation of ERDA/University/State Interaction Involving LASL as a Regional Laboratory," (LASL, 1976), to establish itself as a regional energy laboratory. Dr. Yarymovych and Dr. Liverman provided public support for LASL's plans. Malenfant's document indicated that LASL would direct research in the region, utilize the "189 funding route" to ERDA, and sub-contract its work with joint LASL-university principal investigators. It further noted that LASL would manage the administrative and fiscal aspects of the effort. These "proposals" clearly communicated to the universities that their role in energy research, development, planning, management, and evaluation would be circumscribed by LASL. Dr. Silverman noted:

> At that time I think they were trying to do something that was going to placate us. They were trying to head off things which might develop which would touch sensitive relationships. Sensitive in the sense they had been long-established and they did not want to alter them . . . these were very comfortable sweetheart relationships. And they thought, well, let's throw a couple of bones to these people. [That] is basically the way we perceived that. It was an attempt to derail our efforts (Personal interview, Silverman, March 24, 1982).

The Formation of a Consortium of Regional Universities to Compete for the LASL Management Contract

In a May 24, 1976, memorandum sent by Dr. E. Gerald Meyer, Vice-President for Research at the University of Wyoming to Dr. George Olson, Vice-President for Research at Colorado State University, Dr. Meyer said:

> It was agreed that we should plan a workshop to draw a plan for the regional socio-economic assessment program. LASL proposed that it be the funding agency with an 'Energy Steering Committee' . . . to evaluate proposals; however, each proposal would have to have a LASL co-P.I. and LASL would act as fiscal agent for all contracts. I objected (Meyer to Olson, May 24, 1976).

The interview and document data suggest Dr. Meyer's objection to LASL's becoming a regional energy laboratory and administrative support-unit for ERDA that would replace the competitive peer-review process. Dr. Meyer's feelings were characteristic of the responses among university representatives of IMURA. Their expectations had been substantially diminished since the November and December, 1975, meetings with Dr. Seamans at ERDA offices in Washington, D.C., and now LASL's emergence as ERDA's regional energy laboratory and its control of regional energy research caused concern within the regional universities.

By mutual agreement of IMURA, Dr. Silverman was to direct the group's LASL management proposal. During the month of June, under Silverman's direction, the staff at the University of New Mexico developed a plan for preparing the proposal.

Several events occurring in late June, 1976, illuminate ERDA's response to the University's request for information on LASL and its response to the consortium's proposal effort. On June 21, 1976, immediately prior to ERDA's receipt of Dr. Silverman's letter of intent, Dr. Seamans issued an Immediate Action Direction (IAD), "Administration of ERDA Weapon Program and Weapon Complex." The intent of this IAD was to implement immediately the recommendations of a joint ERDA-Department of Defense Study, "Funding and Management Alternatives for ERDA Utilitary Application and Restricted Data Functions--ERDA 97," made to and accepted by the President of the United States, Gerald R. Ford. The study addressed the appropriateness of ERDA's retaining weapons and other military-application program commitments inherited from the Atomic Energy Commission when ERDA was established. The study concluded that defense-related activities, including weapons research and development, should be controlled temporarily by ERDA. Work on these defense and weapons projects would be performed at existing weapons installations, including LASL. Although the weapons laboratories would be allowed to participate in the energy research and development effort, such activity would be permitted only to the extent that it did not unduly interfere with the weapons programs. The primary mission of the laboratory complex was clearly to remain on the development of weapons programs. Any conflicts between the two types of research would be resolved by reassigning the work not concerned with weapons or defense to another contractor. Under this policy, LASL would be allowed to participate in ERDA's energy research and development effort only to the extent that laboratory facilities were increased or weapons programs were decreases.

The future of federal weapons programs was discussed in several subsequent ERDA publications. These studies indicated that ERDA anticipated the balance of its weapons and non-weapons research and development activities in research laboratories would shift so that non-weapons research would become increasingly dominant. This position was confirmed over the succeeding months by LASL and ERDA officials.

The universities in the region felt that there were sufficient indications in these documents that LASL would increase its participation in energy research and development efforts; based on this assessment, they reaffirmed their position that increased interaction between LASL and regional universities and other energy interests would be desirable.

ERDA perceived the situation quite differently from the members of the university consortium. The Assistant Administrator for National Security (AANS), Lt. General Alfred D. Starbird, U. S. Army (retired),under the authority of Seamans' June 21, 1976, IAD, began reviewing the planned programs of the weapons laboratories to resolve or eliminate possible conflicts between the weapons and non-weapons work. As a result of this review, General Starbird made decisions substantially reducing the non-weapons research and development work to a level below previous ERDA projections.

Evidently, there was a serious breakdown of communications within ERDA and among persons in LASL and the regional universities. ERDA's intentions for including energy research and development activities at LASL were not shared by persons in ERDA responsible for weapons research, and the invitation by an ERDA administrator to several members of IMURA to prepare and submit a proposal to manage LASL was an unfortunate error. Jenkins noted:

> It was my impression that some people back in ERDA felt he [Yarymovych] had spoken out of turn [at the May 17, 1976, meeting in Denver].. But he was present as a Washington representative with university people where he was trying to improve ERDA's relationship with universities in this area (p. 3) . . . [and] It is a pity . . . that the project ever got started on the basis of a misunderstanding. And it was a misunderstanding. ERDA did not want a proposal from the Rocky Mountain universities (Personal interview, Jenkins, July 16, 1982).

On June 25, 1976, Dr. Silverman wrote to Dr. Seamans, ERDA Administrator, stating:

> By this letter we wish to inform you that the University of New Mexico, in association with a regional consortium of Rocky Mountain and High Plains state universities, intends to submit a proposal to the Energy Research and Development Administration, to undertake the contract management of the Los Alamos Scientific Laboratory (LASL) effective at the end of the current contract with the University of California in August, 1977. The decision to pursue this matter has been undertaken after broad consultation with political and university constituents of the region and discussions with ERDA officials and LASL representatives. The support of all the regional constituents and the willingness by ERDA to consider this proposal has encouraged the University of New Mexico to make a major commitment to the preparation effort. This effort is being coordinated in my office.
>
> The collaborating consortium consists of approximately 25 doctoral level universities in the states of Arizona, Colorado, Idaho, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, Utah and Wyoming. We are persuaded that the current and evolving regional activities of LASL will be enhanced by regional management. The nation will be the beneficiary of the mutual interaction resulting form closer working relations between state governments, universities and federal facilities in a region of major energy potential.

> We wish to acknowledge the excellent cooperation we have been provided by the Albuquerque Area Office. We would be grateful for additional advice and guidance on procedures to be followed. We are planning to have a proposal in your office sometime in January 1977 (Silverman to Seamans, June 25, 1976).

Copies of this letter were sent to ERDA and LASL officials, IMURA, the New Mexico Congressional delegation, the Governor of New Mexico, and key administrators in the University of New Mexico.

In July, 1976, the University of New Mexico allocated $50,000 for the purpose of preparing the proposal to be submitted by a consortium of regional universities designated as the Western Regional Scientific Laboratory, Inc. (WRSL). Mr. Milton E. Jenkins was employed by Dr. Silverman as the Project Director, other project staff were hired, and the proposal effort begun. Information needed beyond that provided by ERDA was collected and analyzed, and corporate tasks and organizational requirements were outlined.

During the early information-gathering period, Edmund Kasner described LASL's response as "passive cooperation" (Personal interview, Kasner, May 20, 1982): the universities initiated requests and ERDA responded. However, during the information collection and analysis efforts in July and August, the project staff received many indications that their intentions and objectives had been misunderstood by personnel in both ERDA and LASL. According to Jenkins,

> [I] discussed [the] project with L. A. Jakobwitz, Chief Counsel of ALOO. [I] described what I knew of [the] background of the project [and] how I became involved. I said that [the] initial description to me of [the] contacts, prior to my association with this project, with LASL, ALOO, and ERDA . . . left me with the impression that a formal solicitation of proposals for operation of LASL was forthcoming [and] that UNM [and the] consortium's interest in this was welcome, and that information to assist the consortium (and other bidders) would be available. He replied that, as far as he knew, no solicitation was forthcoming or had ever been

> contemplated. He had on his desk a copy of Dr. Silverman's letter to Seamans [June 25, 1976]; it had been sent to ALOO from Washington for comment. ALOO will not act on the matter until a decision has been made in Washington . . . I described briefly some of the information I felt I needed for [the proposal preparation]. He made notes [and] said he would look into it (Jenkins, "Desk log," 1976, p. 5).

Jenkins also recalled a conversation on July 15, 1976, with Dr. Meyer, Vice-President for Research at the University of Wyoming:

> Mike Yarymovych [ERDA Assistant Administrator for Field Operations] is opposed to a chance in the management arrangements for LASL. If a regional group wants to try, their efforts are not likely to be encouraged (Jenkins, "Desk log," 1976, p. 3).

It was Kasner's opinion that Dr. Roser continued to cooperate until it became evident that the universities were serious. At that point, ERDA began to be less cooperative. Resistance followed when the University of New Mexico began to prepare a proposal to manage LASL. In sum, it appears that once the regional university group began its proposal effort, the passive cooperation previously extended by LASL and ERDA ceased and, contrary to previous indications, the proposal effort was actively discouraged.

An important part of the information collection and analysis phase of the consortium's proposal effort centered on the nature of LASL's existing contract and the procedures it followed in the review-and-renewal process. The original contract executed between the United States War Department and the University of California had been modified over two hundred times between 1943-1976. During this period, no serious efforts had been made by the government to re-open contract for competitive bidding. Over the years, few significant changes in the administration or procedures for awarding of the contract had been made.

The LASL contract usually covered a period of five years. About eighteen months prior to the 1977 renewal date of the contract, the Manager of ERDA's Albuquerque Operations Office initiated the required formal review of the contractor's performance over the previous three and one-half year period. LASL prepared its own program papers and budgets and defended these before ALOO, ERDA headquarters, and Congress. The results of this review were subsequently forwarded to ERDA headquarters.

ERDA headquarters' approval of the performance review completed by the Manager of ALOO led to negotiations with the then-current contractor, the University of California. The approval of the Joint Committee on Atomic Energy (JCAE) for this action was not required. Notification to the JCAE by ERDA that the review[2] had been completed, approved, and that negotiations had begun was all that was required.

In other words, ERDA followed a non-competitive contracting procedure with regard to LASL. When this procedure was later brought into question by the university consortium, it was justified by citing ERDA Procurement Regulation 10 CFR 95-56-401(b):

> Competition for existing operating and onsite service contracts will be sought wherever there is a reasonable expectation that a meaningful improvement can be made in the overall performance of the contract work, including management and operating consts, unless it is determined that to change a contractor would be contrary to the best interests of the government.

---

[2] Although the review procedure finally includes consideration of contract management alternatives to renewal, the substance of this process has not been clarified. However, recommendations for contractor change have been rather unusual and competitive contract procurements have been the exception with regard to Government-owned contractor-operated (GOCO) laboratories. The extensions of the contract to operate LASL were never, historically, placed for competitive proposals or bids.

In view of the LASL operating contract's long, unbroken history of non-competitive procurement and renewal, the government did not see any reason to alter its position.

ERDA's application of its procurement policy closely followed the letter of the law; the universities, however, raised questions about the ERDA-LASL contract's conformity to the spirit of the law. In the Atomic Energy Act of 1954, two sections had provided substantial flexibility to the agency in contracting.[3] Section 31.b of the Atomic Energy Act states:

> The Commission may (1) make arrangements pursuant to this section, without regard to the provisions of section 3709 of the revised statutes, as amended, upon certification by the commission that such action is necessary in the interest of the common defense and security, or upon a showing by the Commission that advertising is not reasonably practicable . . .

Section 162, Contracts, of the Atomic Energy Act states:

> The President may, in advance, exempt any specific action of the Commission in a particular matter from the provisions of law relating to contracts whenever he determines that such action is essential in the interest of the common defense and security.

The language contained in these two sections of the Atomic Energy Act of 1954 can be construed to permit a substantial degree of latitude in the area of procurement; however, that latitude must necessarily be described and justified in terms of "common defense and security."

---

[3] It should be noted that the legislation that established ERDA inherited, in large part, existing regulations and provisions governing procurement procedures.

The circumstances under which non-competitive procurement was allowed at LASL were highly unusual. In general, non-competitive procurement is contrary to the intent of the government's procurement practices, in which the letter and the spirit of the law can usually be clearly understood. For example, Section CFR 10 101.201-1, Competition, of the Federal Procurement Regulations states:

> All purchases and contracts, whether by formal advertising or by negotiations, shall be made on a competitive basis to the maximum practicable under the existing circumstances even though such conditions and circumstances would otherwise satisfy the requirements of Subpart 1-3.2 . . .

The universities understood that regardless of the individual government agency, procurement regulations contained nearly identical language. The intent was clear: non-competitive procurement was to be used only under unusual circumstances and carefully justified at the highest levels, with Presidential approval.

On August 5, 1976, Dr. Seamans, ERDA Administrator, wrote Dr. Davis, President of the University of New Mexico, to inform him that ERDA's consideration of the extension of the contract for the management of LASL had been completed. Dr. Seamans' letter stated that his approval to open negotiations with the University of California

> was based on consideration of all circumstances surrounding the contract, including the expression of interest in Dr. Silverman's letter. The universities' particular interest in the regional activities, particularly the study of energy problems, was cited as not appropriate to LASL's primary mission.
>
> The primary mission of LASL is research, development, and testing for ERDA's nuclear weapon program. Substantial work in the energy field is also carried out at LASL, but only to the extent that such work does not unduly interfere with ERDA's nuclear weapon programmatic responsibilities (Seamans to Davis, August 5, 1982).

Dr. Seamans' decision to open negotiations with the University of California came approximately one month after Dr. Silverman's letter announcing the intentions of the Rocky Mountain universities to submit a proposal;it was made approximately seven months ahead of the schedule discussed with top ERDA officials in June, 1976.

Jenkins surmised that "the decision to extend the University of California contract was hurried when ERDA realized the consortium proposal was a serious proposition" (Jenkins to Silverman, August 19, 1976). John Walsh (1977) wrote:

> When the office of General A. D. Starbird, Assistant ERDA Administrator for National Security, learned of our activity 'all hell broke loose.' A vindictive and personal campaign was waged against Dr. Paul Silverman, Vice President for Research and Graduate Affairs at the University of New Mexico, who carried the primary responsibility for this activity (p. 743).

Dr. Seamans' letter implied that both he and ERDA were completely satisfied with the management of LASL provided by the University of California; in addition, it implied that ERDA was concerned with the prospect of LASL management by the group of Western universities. But more significantly, ERDA's reaction to the university consortium's intent to submit a proposal raised some rather basic questions about the sincerity of ERDA's professed intent. Did it truly wish to rely on universities to find solutions to national energy problems or not? The Western universities believed that the most convincing affirmation of Dr. Seamans' and ERDA's desire for university cooperation and participation would be to reverse the decision to open negotiations with the University of California and give equitable consideration to the WRSL proposal, which they still intended to submit (Kasner, 1982; Silverman, 1982). The regional universities felt that ERDA's position was in direct contradiction with its stated policy on the desirability of substantial interaction with universities.

The Universities' Political Response to ERDA's Refusal to Open the LASL Management Contract to Competitive Bid

The ERDA decision was not acceptable to the group of Rocky Mountain universities that participated in the proposal effort. They felt that Dr. Seamans had reached his decision without careful consideration of the consortium's proposal.

The day after Dr. Seamans wrote his letter to President Davis, on August 6, 1976, the IMURA group met at the University of Montana at Missoula to draft a proposal for the formation of a consortium of universities in the Rocky Mountain and High Plains regions. The purpose of this consortium, The Western Regional Scientific Laboratory, Inc., was to take over the management of the Los Alamos Scientific Laboratory.

At the meeting, Dr. Silverman requested a response to the proposal from members of IMURA by September 1, 1976, indicating "whether or not their institutions wished to participate. Those who do should begin now to make their Congressmen aware of the proposal and its benefits to ERDA, the region, and universities" (Jenkins, "Desk log," 1976, p. 4).

Shortly after Seamans' August 5, 1976, letter to Dr. Davis was received, contacts with the New Mexico Congressional delegation, as well as with other active members of IMURA from Colorado and Wyoming, increased. Dr. Silverman and Mr. Jenkins met with Senator Montoya and his aides, Bob Baca and David Hamilton, on August 16, 1976. At that meeting, Senator Montoya indicated that he was not aware of the consortium's plans to submit a proposal when he voted, as a member of the Joint Atomic Energy Committee, to extend the University of California's contract to manage LASL.[4] He agreed to see that ERDA received and considered the WRSL, Inc., proposal. Later, on August 18, 1976, Dr. Silverman and Mr. Jenkins met with Frank DiLuzio, an aide to Dr. Agnew of LASL. At that meeting, DiLuzio claimed that LASL would not become an energy laboratory in the future and that the consortium's proposal to manage LASL would therefore lack validity.

According to Jenkins,

> A curious turnaround . . . occurred when we were talking to LASL people about the proposal. I can remember Frank DiLuzio taking us aside, once, and saying, "these are the real numbers for the LASL operating budget, and you can see that the energy work we had emphasized so much in our proposal is only this tiny fraction of the budget." This is the same time when [LASL's] public statements were saying that now, more than half [of] the LASL budget was for non-weapons work (Personal interview, Jenkins, July 19, 1982).

Based on these meetings, Jenkins concluded that

> (1) ERDA-LASL does not want us to submit a proposal, (2) ERDA mishandled the matter. The original encouragement given you by Yarymovych was probably genuine but based on ignorance of the 'sweetheart' arrangement concerning LASL and (3) ERDA now fears political repercurssions . . . ERDA will not now accept a proposal to manage LASL (Jenkins to Silverman, August 19, 1976).

---

[4] A copy of a letter from Dr. Silverman to Dr. Seamans dated June 25, 1976, was sent at that time to Senator Montoya. In that letter, Dr. Silverman announced the university's plans to prepare and submit a proposal to ERDA for the management of LASL. The JCAE voted to extend the University of California's contract to manage LASL after this letter was sent to Seamans and a copy was sent to Senator Montoya.

Jenkins recommended that, in order to maintain the consortium's credibility, (1) the proposal effort be continued; (2) a clarification of the future role of LASL in energy research be requested; (3) the extension of the University of California contract be limited to one year, with open competition for the management contract thereafter, and (4) the University should consider approaching the Carter administration if ERDA proved uncooperative.

On August 25, 1976, Dr. Davis wrote to Dr. Seamans, clearly summarizing the universities' position:

> 1. The regulation (10 CFR 9-56.401(b)) under which you claim authority for this decision we believe is impossible for ERDA to make a determination '. . . that to change a contractor would be contrary to the best interest of the government' without considering the proposed management now under development in this region. We believe that a fair appraisal of the proposed regional management contract will result in the conclusion that ' . . . there is a reasonable expectation that a meaningful improvement can be made in the overall performance of the contract work, including the management and operating costs . . .' We believe, further, that this meaningful improvement can be facilitated with due regard for all the military related concerns.
> 2. The fact that LASL has as its primary mission reerach, development and testing for ERDA's nuclear weapon program is well understood. However, it is also clear that the majority of LASL's current activities is in non military energy-related fields. It is also apparent that increasing emphasis is being placed on further expansion of LASL's regional energy concerns . . .
> 3. Finally, it is important for ERDA to understand the intensity of political frustration that currently obtains in this region. Continued exclusion from the decision-making and managerial processes cannot be long tolerated by political leaders of an area of major energy reserves. The August 5th notice of ERDA's refusal to consider a proposal has begun to stimulate initiatives which we may all regret.
>
> For these, and other reasons I respectfully request that you review your decision to open negotiations on a non-competitive basis (Davis to Seamans, August 25, 1976).

Dr. Silverman and Mr. Jenkins met during the first week in September, 1976, with all the members of the New Mexico Congressional delegation--Senator Montoya, Senator Domenici, Congressman Lujan, and Congressman Runnels and Congressmen Roncalio (Wyoming)--in an effort to solicit political support for the universities' LASL management proposal. All members of the Congressional delegation expressed an interest in the LASL management project currently underway. Congressmen Lujan (New Mexico) and Roncalio (Wyoming) listened to the account of events with great concern and suggested that the only way the procedures under which the LASL contract was awarded to the University of California could be reviewed was through a Congressional hearing. Congressman Lujan felt that protecting the weapons role of LASL was not a sufficiently strong justification for awarding the contract to the University of California; he said that he would talk to Senator Montoya about the hearings. Senator Domenici promised that he would make inquiries among the members of the Joint Atomic Energy Commission to determine how the Committee was informed about the contract renewal.

On September 2, 1976, Dr. Silverman and Mr. Jenkins had an interview with General Starbird and Ralph Goldenberg of the ERDA legal staff at ERDA headquarters. They were informed that General Starbird had personally conducted an investigation to learn who in ERDA had indicated to UNM that a proposal to manage LASL would be welcomed. The investigation found no one who acknowledged responsibility for this action ("Synopsis of the LASL Management Project," UNM, 1977, p. 10). General Starbird emphasized the importance to national security of the demonstrated competence of the University of California's management of LASL and other laboratories and expressed his concern that a change of management contractors would disrupt vital, on-going programs. A change of management contractors, in General Starbird's opinion, would be considerably "more trouble than could be justified, particularly since the weapons program was and would continue to be, the primary mission of LASL" ("Synopsis of the LASL Management Project," UNM, 1977, p. 10). General Starbird made his and ERDA's position quite clear: a proposal for managing LASL was neither welcome nor desirable.

Silverman later reflected on this situation in a memo to Dr. Paul McDaniel, former President of Argonne Associated Universities:

> Some unexpected things happened. The university people had been talking to officials on the 'energy' side of ERDA, and no one had said a word to the 'weapons' group under General Starbird. The weapons people apparently regard LASL as their private preserve and want no outside interference, despite the fact that more than half of LASL's budget now comes from the energy side of ERDA and LASL has been promoting itself as a 'regional energy laboratory' (Silverman to McDaniel, October 18, 1976).

Shortly after Silverman's and Jenkins' meeting in Washington with the New Mexico Congressional delegation and with Congressman Roncalio of Wyoming, the administrators contacted Chuck Willis, Senator Montoya's aide for atomic energy, and told him of their discussions with ERDA. Chuck Willis suggested that a meeting be arranged between Senator Montoya and General Starbird for September 13th or 14th and that Dr. Silverman provide him with a list of questions that the Senator could use in the meeting. A list of questions was sent to Senator Montoya on September 6th and to Congressman Lujan on September 10, 1976. Congressman Lujan wrote to Dr. Seamans, attaching the list of questions, and said in part:

> With the decision to award the contract for the Los Alamos Scientific Laboratory to the University of California without competitive bidding being allowed, I am sure you can

> understand the need to question such actions. Since, as a rule, most government agencies are required to allow competitive bids or at least accept proposals from other potential contractors, in this case the University of New Mexico being one of several who wanted to jointly operate the LASL facility. I cannot let the awarding of the contract to California go unchallenged and I would like to request your cooperation and assistance in answering some pertinent questions. . .
>
> All in all, it appears that ERDA is being less than candid in not allowing competitive bidding and I can only question the legality of such action. I have never seen any legislation, regulation, or proposed action which would give ERDA exception status over all other government-funded agencies and I can only wonder, and speculate about why ERDA would not allow other potential contractors, equal or superior to California, to have the opportunity to bid on the LASL contract. I believe that the University of New Mexico and other institutions of higher learning which are interested in this contract, have the qualifications and ability to handle the contract as least as well, and perhaps better than California . . . (Lujan to Seamans, September 15, 1976).

Dr. Silverman and Mr. Jenkins met with Congressman Lujan on September 10, 1976, to discuss the LASL situation. (Lujan had been in contact with Senator Montoya.) Lujan said that he had no objections to holding Congressional hearings on the LASL contract, but that he would like to hold them after the election, since in his judgment, Senator Pastore, Chairman of the Joint Committee on Atomic Energy, would probably not approve of the hearings before then.

ERDA did not respond to Congressman Lujan's list of questions immediately. However, a telephone call from Mr. Frank DiLuzio to Mr. Jenkins on September 13, 1976, indicated that LASL was working on the answers to the questions sent them from Washington.

During this period, LASL began an active campaign to discredit the universities' preparation of a proposal to replace the University of California as managers of LASL. Silverman noted that he had talked to Dr. Agnew about the consortium of universities preparing a proposal to take over the management of LASL, and Silverman recalled, "He was rabid! Vehement! . . . he called us all kinds of names and misrepresented what we were trying to do" (Personal interview, Silverman, March 24, 1982). Further support for this interpretation of Agnew's position is found in the "Synopsis of the LASL Management Project" (UNM, 1976), in which Dr. Agnew

> approached one of the Regents of the University of New Mexico [Calvin Horn], suggesting that the actions of the University group were improper and undesirable and that if the University of California became annoyed by these actions, relations between LASL and UNM would suffer. Approaches were also made to members of the New Mexico Legislature with the suggestion that if the University of New Mexico took over management of LASL (apparently the involvement of other universities was not mentioned), the shift would place an enormous financial burden on the State of New Mexico in the form of responsibility for accumulated employee retirement benefits ("Synopsis of the LASL Management Project," UNM, 1977, p. 11).

On September 10, 1976, Jenkins met with Paul Silverman, President Davis, and Calvin Horn to discuss information Horn had received from Dr. Agnew. According to Silverman,

> We got all kinds of warnings not to muck around with this . . . I remember Jerry Apodaca delivering this message, that if we continued to pursue this thing that Los Alamos would see to it that the contracts that are currently being let by Los Alamos, within the state, would go out of state (p. 16) . . . He had been very deeply impressed . . . Agnew was an extraordinarily forceful person [and] speaks with a great deal of authority . . . I remember that was very discouraging, that discussion with Apodaca (Personal interview, Silverman, March 24, 1982).

On September 15, 1976, Jenkins noted that he spoke with Chuck Willis, Senator Montoya's aide, about the Senator's meeting with General Starbird. General Starbird agreed to have ERDA prepare answers to the list of thirty questions given him by the Senator. The general noted that there appeared to be some unfortunate confusion over time-factors that prevented proper consideration of the consortium's proposal for the LASL contract. He indicated to the senator that he would investigate the possibility of improving cooperation between LASL and the universities and that consideration would be given to open competitive bidding for the LASL management contract in the future. It was definitely a conciliatory tone. Jenkins, in a memo to Paul Silverman, noted:

> He [Starbird] . . . said that attention was being given to avoiding duplication of research capabilities in the national laboratories and the universities . . . On September 15, I called Gerry Meyer to inform him of the talk with Willis. Gerry's going to Washington on September 16th and to inform Roncolio of the situation. I told Gerry that I interpreted Starbird's statements to Willis as the first conciliatory indication from ERDA and suggested that the universities might develop a cooperative arrangement with LASL to direct energy research in the region in the short term, looking forward to open competition for the LASL management contract in the future.
>
> Gerry was strongly opposed to any suggestion of cooperative effort. He said that ERDA continues to think of directing research funds to the universities through the national labs and that this is an unacceptable arrangement (Jenkins to Silverman, September 16, 1976).

Jenkins believed that the consortium could develop a role "in the energy-related research and energy-related liasion activities in the region . . . and materially assist the regional universities in competing for energy research work" (Jenkins, "Desk log," 1976, p. 2). He recommended that pressure be kept on ERDA both from President Davis and from the New Mexico and Wyoming Congressional delegations and that the consortium continue to prepare a proposal to "do everything except take over the LASL management contract" (Jenkins, "Desk log," 1976, p. 2). But he also cautioned:

> We should continue our contacts with political figures on the matter but leave the question of the JCAE hearings in

> the hands of the professional politicians. Too much political activity on our part may have a negative effect on ERDA's consideration of whatever proposal we submit, might engender a negative attitude at ERDA toward any other proposals from UNM or other Rocky Mountain universities, and could, if inexpertly done, furnish material to be used in downgrading future efforts of the universities to engage in any large-scale research efforts (Jenkins, "Desk log," 1976, p. 2).

On September 21, 1976, Dr. Agnew responded to Dr. Davis's letter of September 16, 1976, stating:

> We are not involved, nor will we ever be, in 'decision-making and managerial processes concerning energy development' for our region. In a very small way we hope to assist our regional colleagues in assessing the resources available and options open, but we won't be telling anyone what to do . . . The totality of LASL regional work which is directly related to the thrust of your letter [energy research] is less than one-half of one percent of our total budget. Even if it doubles, and I doubt that this will happen, it still is in no way representative of what our major responsibilities are (Agnew to Davis, September 21, 1976).

On October 8, 1976, Jenkins noted that Mr. Getzinger, Senator Domenici's aide, had called to report a conversation between the Senator and Senator Howard Baker (Tennessee). Senator Baker had told Senator Domenici that neither he nor the other members of the Joint Committee on Atomic Energy had been informed of the WRSL, Inc., proposal as a possible alternative to ERDA's decision to extend the University of California-LASL contract. Dr. Seamans responded to Senator Baker's inquiry by stating that ERDA had examined the situation and determined that the continuation of the University of California's contract was the course of action most advantageous to the government. Senator Baker did not like the reply and informed Senator Domenici that he would support a move to hold Congressional hearings on the matter.

In late October and early November, 1976, ERDA responded to the questions that were raised individually by Senator Montoya, Congressman Lujan, and President Davis. Again, ERDA cited the University of California's outstanding performance and existing government regulations as the bases for their non-competitive awarding of the LASL management contract.

The answers to the questions raised contained two significant points: the first indicated that at least eighteen months would be required to receive and evaluate competitive proposals for a major management contract like the one for LASL and that a period of only fourteen months prior to the contract renewal-date would be unlikely to be favorable in a competitive procurement situation. The second significant lesson was that competitive proposals had never been sought in selecting a contractor to manage a major weapons laboratory.

The approach of national elections in the fall of 1976 to some degree inhibited effective university political action. Dr. Silverman noted:

> Our efforts to obtain information and decisions from the Energy Research and Development Administration concerning the project are still encountering delays. Some of these arise from the political implications of discussions about the management of the laboratory, which produced a strong tendency to delay matters until after November 2 (Silverman, to members of IMURA, October 25, 1976).

Sources in ERDA indicated at this time that Dr. Seamans would resign his position in the near future. Changes in the committee system of the United States Senate had also been proposed, and many influential Senators withheld their support for the consortium out of concern for national and senatorial elections and new committee appointments--in particular, proposed changes in the committee system would include the abolition of the powerful Joint Committee on Atomic Energy. New Mexico's Senator Domenici was, at this time, being considered for a key position on the emerging Senate Science Committee.

The University's effort to bring political pressure to bear on ERDA continued, however; plans were made to increase the political activities after the November 2nd election but before Congress reconvened. The University planned to brief important members of the Congressional staffs and the new Carter administration.

The formation of the university consortium proceeded during the months of August, September and October, 1976, with some degree of success, and the projected date for a decision by regional institutions on membership in the proposed corporation and participation in the LASL management proposal was extended through the end of November. Dr. Silverman, in a memo to members of IMURA dated October 25, 1976, noted that several members had

> expressed concern about participation in a consortium arrangement for management of a technical project of this nature. Their concern arises from unhappy experiences with such arrangements in the past. What we are proposing is [the] organization of a management corporation, rather than a consortium, and we are now having the proper documents drawn up to clarify the relationship (Silverman, to members of IMURA, October 25, 1976).

The twelve institutions that had expressed an interest in becoming members of the corporation included Arizona State University, The University of Arizona, Idaho University, Montana College of Mining, Technology and Science, Montana State University, South Dakota School of Mines and Technology, South Dakota State University, The University of Montana, University of Nebraska, The University of Nevada, The University of New Mexico, and The University of South Dakota.

By the end of October, the proposal to manage LASL had progressed through the preparation of an initial draft, including (1) outline of the proposal, (2) introduction, (3) scope of work, (4) rationale,

(5) management plan, (6) the structure of the corporation, and (7) a background paper summarizing the events leading to the existing situation. These documents were forwarded to institutions interested in becoming members of the corporation for their review and comment. In addition, membership agreements were drafted by Mr. William Sloan, Attorney for the University of New Mexico, and reviewed by Dr. Silverman and his staff.

On November 10, 1976, President Davis, Dr. Silverman, and Mr. Jenkins met with Congressman Lujan. The Congressman reported Dr. Agnew's willingness to compromise on the issue of an agency other than the University of California for managing LASL; however, Agnew indicated his preference for the University of New Mexico as sole management agent. Two compromise strategies were discussed, each of which depended on ERDA's eventual position: (1) the corporation could assume the responsibility of managing LASL's regional affairs even though the University of California retained the contract, and (2) the University of New Mexico could take the contract as an individual institution but maintain a close working arrangement with other regional universities. Both possible courses, however, required political pressure on ERDA. Congressman Lujan indicated that he intended to meet with Senators Domenici and Schmitt, and possibly with Congressman Runnels in preparation of a strong statement in support of the consortium's LASL management proposal. Dr. Silverman discussed the LASL management project with Senator Schmitt on Saturday, November 13, 1976.

On December 6, 1976, a meeting was held in President Davis's office. Those who attended included President Davis, Milton Jenkins, Dr. Silverman, Dr. Travelstead, Mr. Kasner, Dr. Eric Willis, ERDA

Assistant Administrator for Institutional Relations, and Dr. Herman Roser (ERDA/ALOO). The purpose of the meeting was to discuss alternatives to the consortium taking over LASL in its entirety. The ERDA representatives indicated that ERDA was actively seeking a solution to the problem. In addition, Roser told the group that weapons and non-weapons work at LASL could be separated. The university representatives expressed an interest in managing the non-weapons activities at LASL.

On December 9, 1976, ERDA and university representatives again met in President Davis's office. Representatives of ERDA now indicated that they were ready to explore possible, but limited, working arrangements with the universities. The University of New Mexico, although not speaking for all the institutions, was interested in all the work at LASL and indicated its desire to open communications with a review of all of LASL's present and planned programs. In addition, the University indicated that ERDA's renewal of the University of California contract for more than a one-year period before proper consideration of regional university interests would be viewed with disfavor in the region.

Several events during the last two weeks of December, 1976, confirmed the University's belief that ERDA had shifted its position yet again. On December 20, 1976, Eric Willis informed Dr. Silverman that ERDA and LASL were setting up a meeting at Los Alamos for January 31-February 3, 1977, to brief consortium university representatives on LASL non-weapons program. On December 28, 1976, Dr. Agnew, President Davis, and Congressman Lujan met in Congressman Lujan's office to discuss university participation in LASL programs. On January 3, 1977, however, Dr. Willis called Dr. Silverman, now Associate Provost for Research and Academic Services,[5] informing him that the meeting designed to brief the universities would last only one day. Dr. Silverman wrote to Dr. Willis on January 4:

> I hasten to convey in written form my expressions of dismay to learn that the meeting between LASL, ERDA and representatives of the Western Regional Scientific Laboratory Corporation (WSRL) had been tentatively relegated to a one day affair, apparently mainly to consist of presentations to the WRSL with little opportunity for follow-up discussions so necessary for the future negotiations on the management of LASL . . . the purpose of the meeting at Los Alamos is to review in general terms the current and planned programs at LASL, with special emphasis on the non-weapons programs . . . It is our understanding, from the meeting in Dr. Davis's office, that the information obtained at this meeting is to provide an appropriate data base for negotiations between WRSL and ERDA for the management of LASL, either wholly or in part (Silverman to Willis, January 4, 1977).

On January 7, 1977, Jenkins noted:

> A controversy has arisen in ERDA Headquarters about the purpose of the January-February meeting at LASL. Apparently the [Assistant Administrator] for Institutional Relations, [Dr. Eric Willis] and the [Assistant Administrator] for National Security [General Starbird] disagree. ERDA now maintains the meeting cannot be a basis or a starting point for discussions of the management of any part of LASL operations (Jenkins, "Desk log," 1977, p. 55).

The representatives of the regional universities involved in the management proposal effort disagreed with General Starbird's position and felt that "political strings" were being pulled. They believed that Dr. Agnew had talked with Mr. Schlesinger, the new ERDA administrator, about the proposal effort and the scheduled meeting in an effort to prevent any further discussions concerning the management of LASL operations.

---

[5] The official name of the Office of the Vice-President for Research and Graduate Affairs was changed during January 1977 to the Associate Provost for Research.

On January 11, 1977, Dr. Silverman met with members of the University and proposal staff, including Mr. Sears, Mr. Price, Colonel Grant (ret.), Mr. Kasner, and Mr. Jenkins. Between mid-December and the first week in January, this group reviewed in meetings ERDA's inability to deal directly with the universities. A decision was made at that time to take the initiative. Mr. Sears and Mr. Price were asked to prepare a news release and Mr. Jenkins and Colonel Grant were asked to finalize the articles of incorporation and the by-laws of the corporation. Mr. Kasner was designated to go to Washington to brief the New Mexico Congressional delegation.

The Western Regional Scientific Laboratory, Inc., was incorporated in New Mexico in January, 1977; its members included The Colorado School of Mines, Colorado State University, The University of Denver, New Mexico State University, The University of Colorado, The University of Nebraska-Lincoln, The University of New Mexico, th University of Utah, Utah State University, and the University of Wyoming as charter members.

On January 14, 1977, Dr. Seamans wrote to President Davis informing him of ERDA's decision to proceed with negotiations with the University of California for the management of LASL. In addition, Dr. Seamans stated:

> In view of my decision . . . I see no use being served by its discussion at the forthcoming meeting. Accordingly, I am directing my staff to proceed with the meeting on the basis that its purpose is to provide information concerning the programs at LASL and the manner of their administration, and not future management of LASL (Seamans to Davis, January 14, 1977).

During the latter part of January, Dr. Silverman sent a letter to the "charter institutions" of the corporation, informing them of the corporation meeting scheduled for, before, and after the shortened, one-day LASL meeting. In addition, Dr. Silverman sent to these institutions copies of a completed proposal, "A Proposal for Management of Los Alamos Scientific Laboratory (WRSL, Inc., 1977) and final copies of the Corporation's By-Laws, Membership and Associate Membership Agreements, and Articles of Incorporation.

On January 28, 1977, New Mexico Governor Jerry Apodaca wrote to President Davis:

> I have been following with great interest the activities of the consortium to acquire the management contract of the Los Alamos Scientific Laboratory . . . I have discussed this matter with Harold Agnew . . . I wish to convey to you personally my concerns with regard to the potential implication of a consortium attempt to manage LASL. It may be in our best interest to stay out of the management business . . . (Apodaca to Davis, January 28, 1977).

On January 30, 1977, President Davis and representatives of universities interested in membership in both the WRSL and the LASL management project met at the university; however, "no decisions [were] reached on [a] future course of action" (Jenkins, "Desk log," 1977, p. 62).

The LASL meeting took place on January 31, 1977. A review of LASL programs was presented, revealing very little management-input from the contractor. General Edward B. Giller, ERDA Deputy Assistant Administrator for National Security, made the presentation on behalf of General Starbird. He disabused the university representatives of any doubts about ERDA's national security section's reaction to WRSL's proposal to manage its weapons laboratory.

The most significant facts presented at this meeting centered on LASL's plans for future programs. Weapons research would constitute approximately 60% of the budget, with an increase in the weapons budget projected over a period of time. The non-weapons work constituted approximately 40% of the budget, but only about 1% of the total budget would be designated for what LASL categorized as regional energy studies. This information contradicted both LASL's and ERDA's previously-published statistics as well as those of the University of California's official 1976 investigating committee (the Geberding Committee). The Janaury 31, 1977, meeting and the recent experience of the regional universities with ERDA made it quite clear that there would not be any change in LASL programs or management that could provide for more direct participation by regional universities.

The universities, however, persisted. Jenkins noted:

> After the briefing, the university presidents and representatives met and agreed to seek [a] contractual relationship that would give [the Corporation] a value in view of [the] programs generated by ERDA for energy development and research, in the region. This will be done by a direct approach to ERDA headquarters with the proposal that the Corporation undertake programmatic reviews of regional plans (Jenkins, "Desk log," 1977, p. 63).

Senator Stewart Udall (D.AZ) and Dr. Silverman discussed the LASL management project back on the University campus during the first week in February, 1977. Mr. Udall advised Dr. Silverman to contact Mr. S. David Freedman in the Executive Office of the President, Energy Policy and Planning. He felt that the need to utilize the universities' capabilities in the near-term should affect ERDA's LASL management contract decision; an all-out effort was needed to develop and exploit non-nuclear energy capabilities. Dr. Silverman, in his February 8, 1977, letter to Mr. Freedman, advocated a review of the LASL program-shift back to weapons and a review of the contract-award.

The data indicate that the consortium persisted in its efforts to bring political pressure to bear on ERDA and to revise the By-Laws of the Western Regional Scientific Laboratory, Inc. At the first WRSL, Inc., Board of Directors meeting in Las Cruces, New Mexico, in March 4, 1977, a motion to submit the proposal to Dr. Robert Fri, ERDA's Acting Administrator, was made, seconded, and unanimously passed.

Dr. Silverman submitted the proposal to ERDA on March 8, 1977. In his cover-letter to Dr. Robert Fri, Dr. Silverman stated that the six institutions of higher education that were members of WRSL, Inc.--Colorado State University, The University of Denver, The Colorado School of Mines, The University of Colorado, The University of New Mexico, and The University of Wyoming--were

> vitally interested in seeking solutions to the problems that will accompany energy development in the region [and] represent a large capacity for research and believe that capacity can be utilized most effectively by working in close concern with . . . Los Alamos . . . We are prepared to explore with ERDA the full range of possible relationships between the Corporation and the regional energy laboratory (Silverman to Fri, March 8, 1977).

The Failure of Political Action and the Dissolution of the Consortium

On March 24, 1977, Dr. Silverman received a letter from General Starbird, along with the unopened proposal. General Starbird was acting on directions from the ERDA Administrator responding to WRSL, Inc.'s unsolicited proposal for management of LASL. He indicated that a decision had been made on August 5, 1976, to re-negotiate the LASL management contract with the University of California and that the contract extension had already been signed by ERDA for an additional five-year period. He also encouraged the universities to continue "discussions with Dr. Eric Willis on the broader questions of regional research and development and the role your institution UNM can play" (Starbird to Silverman, March 24, 1977). The WRSL response to ERDA's letter of refusal indicated that it intended to examine alternative arrangements to accomplish improved relations. Silverman, in his letter to General Starbird, dated April 5, 1977, noted the

> reluctance on the part of ERDA to alter the management arrangement . . . is understandable, particularly in view of the projected future course of [LASL] . . . operations . . . It was our understanding, based upon an interpretation of the role LASL was to play in future energy developments that a change in emphasis in LASL programs was to take place . . . Because we are now concerned that a new management arrangement for LASL is not, for the present, [possible]. . . we shall act upon your suggestion and explore with Dr. Eric Willis other possible arrangements for expansion of relations between the universities and ERDA (Silverman to Starbird, April 5, 1977).

A meeting with Dr. Eric Willis, Assistant Administrator for Institutional Relations, ERDA, was subsequently arranged for April 22 in Denver, to coincide with the regular meeting of the WRSL Board of Directors.

In preparation for the Directors' meeting, the member-universities agreed that a draft proposal should be prepared that would establish WRSL, Inc., as a service organization for both ERDA and the regional universities. The proposal called for the collection and organization of information on the capabilities of regional universities to perform research for ERDA. However, by the latter part of April, 1977, no clear picture of the university-ERDA relationship had become evident. The university members of WRSL, Inc., agreed to pursue this question through contacts in the federal government in an effort to seek clarification of ERDA's intent towards involvement of universities in ERDA-sponsored energy research programs. They also resolved to make their views known through continued political contacts with their respective Congressional delegations.

Dr. Willis met with the WRSL Board during its April 22, 1977, meeting in Denver. He spoke briefly of the need to clarify ERDA-university relationships. At this time, he raised questions about the future role of WRSL and cited several possibilities:

(1) the universities could continue to pursue a collective effort to increase their involvement in energy research by seeking a management role in LASL operations;

(2) the universities could collectively seek to increase their involvement in energy research activities by working with regional policy-making groups;

(3) the universities could collectively seek to increase their energy research activities through direct contact with federal government agencies.

Dr. Willis asked that the universities give full consideration to how ERDA could more effectively assist them in these and other related activities. Dr. Silverman described in general terms the substance of the proposal that had been prepared specifically for this meeting. Dr. Willis agreed to consider the proposal when it was submitted to ERDA. The Board, after consideration of the discussions, decided that a revised version of the proposal should be prepared.

On May 26, 1977, Dr. Silverman and Dr. Meyer of the University of Wyoming met with three members of Dr. Willis's staff, Rich Stephens, Ken Picha, and Sid Roth, to discuss WRSL's latest proposal. The data indicate that the consortium members left the meeting with the distinct impression that Dr. Willis wished to arrive at a contractual arrangement that was mutually satisfactory. This discussion and a copy of a proposal submitted and funded by ERDA provided additional insights into ERDA-university relationships as well as possible areas for university involvement in energy research activities. Dr. Meyer planned to continue the discussions with Dr. Willis's staff later in the week of June 7, 1977. The consensus was that gathering additional information could place WRSL, Inc., in a position to pursue a more definitve course of action in its preparation of a proposal to ERDA. After subsequent meetings and proposal revisions, the Board of Directors of WRSL, Inc., in their August 24, 1977, meeting in Denver, established the week of August 29, 1977, as the target-date for mailing the proposal, Determination of Energy Resource Development Problems: Research Agenda: University Research Capabilities and Linkages of the Rocky Mountain and High Plains Region (UNM, 1977), to ERDA. This was accomplished on schedule.

During the months following the January 31, 1977, meeting at LASL, the universities shifted from their long-term objective of managing LASL to pursuing a contractual relationship with ERDA for examining regional reearch problems and capabilities. At the same time, the WRSL, Inc., effort to keep political pressure on ERDA continued unabated: Dr. Silverman maintained close contact with the New Mexico Congressional delegation, and Dr. George Olson, Vice-President for Research at Colorado State University, maintained close contact with the Colorado Congressional delegation, particularly Senator Floyd K. Haskell, who wrote a letter to President Carter concerning the interest of the regional universities in managing LASL.

In August, 1978, Dr. Silverman learned that President David Saxon of the University of California had charged Executive Vice-

Chancellor William P. Gerberding to investigate and determine under what circumstances it was appropriate for the University to continue managing Lawrence Livermore Laboratory and the Los Alamos Scientific Laboratory (Gerberding, 1978, p. 1). The Regents of The University of California on several occasions during the 1975-1978 period came within a narrow margin of voting to sever their ties with the atomic weapons laboratories. A climate of uncertainty about the University of California's future relationship with LASL was apparent. And although this circumstance was initially viewed as a politically-opportune moment for a group of politically-weaker Rocky Mountain universities to take over LASL, Dr. Silverman viewed it rather as an opportunity to continue to push for an investigation of the relationship between LASL and the regional universities. Dr. Silverman felt that the Gerberding Committee's public hearings on The University of California's relationship with the Los Alamos and Lawrence Livermore Laboratories were an important public forum for WRSL, Inc., to continue its pressure on ERDA.

The continued unwillingness of ERDA to deal with the regional universities and their several proposals was frustrating and discouraging to Dr. Silverman. The data suggest that his efforts to muster political support proved ineffective in moving ERDA to reconsider its management contract decision and to consider a role for regional universities in energy research. Efforts to get the universities' Congressional delegations to intervene in ERDA's contact-renewal negotiations with The University of California "just never got off the ground" (Personal interview, Silverman, March 24, 1982). No Congressional issue was identified, and an investigation into the procurement procedures surrounding the award of the LASL management contract to The University of California never materialized. The Congressmen just "took a sideswipe at ERDA" (Personal interview, Kasner, May 20, 1982). Kasner noted that everybody

> realized that it was an exercise in futility. There was a chance, and at one time, was not a bad chance . . . It looked, on the surface, [that]it could succeed. The only thing is that once the government mustered its forces, and it's such a large, monumental task to move anything against the government, there was just no chance that it would succeed. It was more like throwing a stone in a millpond, it made a ripple (Personal interview, Kasner, May 20, 1982).

Jenkins, Kasner, and Silverman concurred in believing that perhaps the most important effect of WRSL, Inc., was that it brought attention to LASL's work in the region and "at least slow[ed] down and may have inhibited, to a high degree, the preying of LASL on university . . . research faculty" (Personal interview, Kasner, May 20, 1982).

Dr. Silverman resigned his position as the Associate Provost for Research and Academic Services at the University of New Mexico to accept a position with the State University of New York at Albany. Dr. Joseph V. Scaletti was appointed Acting Associate Provost for Research and Academic Services in September, 1977. Dr. McAllister H. Hull, Jr., Provost, University of New Mexico, then represented the University in WRSL, Inc., and was appointed as the Corporation's second temporary president.

The last hope for the future of WRSL, Inc., as a consortium of Rocky Mountain and High Plains universities lay in the response of the Department of Energy (DOE) to the August, 1977 WRSL, Inc. proposal. On November 11, 1977, the status of the proposal was discussed with Mr. Richard Stephens, Acting Director of the Office of University Programs in the Department of Energy. Mr. Stephens indicated that the WRSL, Inc., proposal was being considered actively and that it had his personal support. On November 21, 1977, Dr. Hull informed the Board of Directors of WRSL, Inc., that

> Our situation calls for decisive action by the Board within the next two weeks. The basic courses of action open to us are to terminate or continue our effort . . . The key factor . . . is providing additional operating funds for the Corporation. Without additional funds we must dissolve the Corporation as soon as possible (Hull to members of the WRSL, Inc., Board of Directors, November 21, 1977).

Funds were subsequently approved by the Board. Dr. E. Gerald Meyer, Vice-President for Research at the University of Wyoming, reported to the WRSL, Inc., Board meeting in Salt Lake City, Utah, on December 2, 1977, that the proposal submitted to the DOE in August was in limbo because of reorganization efforts underway as a result of restructuring of ERDA as a cabinet-level Department of Energy. A meeting was held between the university group, Dr. Hull and Dr. Meyer, on December 20, 1977, to discuss the status of the proposal. The creation of the Department of Energy and the reorganization efforts that followed had delayed consideration of the proposal.

During February, 1978, Dr. Meyer talked with Richard Stephens of the DOE regarding the WRSL, Inc., proposal to coordinate university research in the Rocky Mountain area. He was informed that the proposal had been rejected by the DOE. Consequently, Dr. Meyer expressed his opinion to the Board members at the April 13, 1978, meeting "that the proposal was the victim of bad timing and bureaucratic organizational problems" (Minutes of the Board of Directors, WRSL, Inc., April 13, 1978). All representatives present and voting acted on a motion to dissolve the Corporation. The motion was unanimously adopted and, with that action, the Western Regional Scientific Laboratory, Inc., and its attempts to establish a formal corporate role for universities in the region to conduct energy research ended.

Summary

The University's creation of the Office of the Vice-President for Research ennabled the institution to focus on aggressively pursuing external research support. This entrepreneurial research development program included several important characteristics: (1) an increase in inter-institutional cooperative activities; (2) the establishment of intra-state, regional, and national energy research development plans; (3) an increase in personal contacts with key administrators in federal funding agencies, and (4) an increase in contacts with the New Mexico Congressional delegation.

The Arab oil embargo of 1973 focused the nation's attention on the need for pursuing energy independence. This historical event stimulated the creation of the federal Energy Research and Development Administration in 1975. It also focused attention on the natural resources of the Rocky Mountain and High Plains region. Initially, ERDA indicated that it would rely heavily on the reearch capabilities of the nation's universities; however, as the pressure on ERDA to "produce" increased, it turned to its long-term national weapons laboratory system.

Regional universities were concerned with the negligible role that faculty researchers would apparently play in ERDA's program. Accordingly, when LASL announced its shift from a weapons to a non-weapons, energy research laboratory directly competing with regional universities for research support, regional universities became alarmed, foreseeing a drain on their own research faculty as well as a monopolization of energy research in the region. At the invitation of ERDA administrators, some members of IMURA joined an effort to prepare a proposal and form a consortium to take over the management of LASL. Throughout 1976-1978, the level of competition for research hegemony between LASL and the universities increased. Political activities became more intense, and the level of inter-institutional cooperation grew among members of IMURA.

ERDA refused to accept the consortium's proposal, instead renewing its contract with the University of California to manage LASL for an additional five-year period. Consequently, the universities attempted to initiate Congressional hearings into the review-and-contract-renewal procedures used by ERDA. This effort, as well as a second proposal to involve regional universities in an ERDA regional energy assessment program, failed. The consortium of universities, the WRSL, Inc., was dissolved in April, 1978.

Although the universities' attempt to take over the management of LASL failed, it did have a significant impact on ERDA's plans to make LASL a regional energy laboratory. ERDA confirmed that LASL would remain primarily a weapons laboratory. This policy decision effectively prevented LASL from becoming a substantial competitor to regional universities for energy research support. ERDA also dropped its plans to designate LASL as a regional project-reviewer that could control the flow of energy research in the region. Thus, LASL's threat as a direct competitor to regional universities diminished substantially and the acquisition of energy research support continued as it had in the past, through the traditional ERDA peer-review process.

Chapter III

Methodology

The dynamic process through which an institution of higher education responds to change in its external environment and develops from an undergraduate teaching institution in the direction of a graduate research university is not well understood. The literature on institutional adaptation to external environmental change is essentially atheoretical in nature and contains little work designed to test theories describing the dynamics of the change process (Giaquinta, 1973, p. 178).

This study of the University of New Mexico's response to change in its external environment and its development in the direction of a research institution during a "bounded" period of time, 1967-1978, is directed towards developing a set of naturalistic generalizations and a building theory rather than towards affirming a prevailing theory. The significance of discovering theory from data, the generation of hypotheses, "grounded theory" (Glaser and Strauss, 1967), lies in the researcher's ability to arrive at "relevant predictions, explanations, interpretations and applications" (p. 1) that are both empirically sound and singularly pertinent to the phenomenon under study. The unit of study of this ethnohistorical investigation (Schumacher, 1972) is the University of New Mexico.

Rationale

The choice of research methodology is determined by the nature of the problem under investigation (Schumacher, 1972; Lofland, 1971). This study of how an institution of higher education adapted to changes in its external research-support environment employs a methodology that recognizes that the actions of participants, "relationships and events occurring over time . . . need to be examined holistically and in their natural setting" (Higbie, 1981, p. 44). Filstead (1979) has noted that

> Qualitative methodology refers to those research strategies . . . which allow the researcher to obtain first-hand knowledge about the empirical social world in question. Qualitative methodology allows the researcher to get close to the data, thereby developing the analytical, conceptual, and categorical components of explanation from the data itself (p. 33).

The perspective through which knowledge and understanding are developed here is principally one of inductive analysis, beginning from the specific events and moving through generalizations towards broader contexts and applications:

> One begins not with models, hypotheses, or theorems but rather the understandings of frequently minute episodes or interactions that are examined for broader patterns and processes. It is from an interpretation of the world through the perspective of the subjects that reality, meaning, and behavior are analyzed (Rist, 1982, p. v).

A field-study approach provides a flexible means through which the multi-faceted aspects of a university's response to external environmental change can be examined comprehensively (Babbie, 1979). Studies of complex organizations often employ field-research methods, which include what Iannaccone (1975) describes as

> a pattern of activities which consist of a reiterative cycle of sequentially collecting data, analyzing it to develop crude hypotheses which guide the next stage of data gathering, collecting additional data, reanalysis, and further hypothesis development, and rechecking with additional data collection followed by continued reanalysis (p. 222).

The utilization of the field-study methodology and case-studies in the examination of adaptation and change of complex organizations to their environment is not without precedent (Baldridge and Deal, 1975; Emery and Trist, 1965; Herriot and Gross, 1979; Levine, 1980; Martorana and Kuhns, 1975; Miles, 1964; Smith and Keith, 1971). Investigators who have used field-study methodology and case-studies in the examination of various phenomena in higher education include Gross and Brambsch, 1968; Fioke, 1981; Greely, 1967; Higbie, 1981; Pace, 1974, and Paltridge, Hurst and Morgan, 1973.

The importance of university participation nationwide in the conduct of research has been well-documented in the literature (Finn, 1978; Hornig, 1966; Kidd, 1959; Klopsteg, 1959; Orlans, 1962, and Smith and Karlesky, 1977). However, virtually nothing exists in the literature concerning how institutions of higher education adapt to changes or how they develop in the direction of research institutions during periods when federal support for research becomes unstable and competition for funds increases.

It is well-known that the shape and direction of scientific research have become important parts of the public enterprise; they are symbiotically and directly related to the research capabilities of the nation's universities and the federal government's ability to meet national needs. The federal government depends heavily on the strength of the nation's system of higher education and its research capabilities. In turn, researchers and universities rely heavily on the federal government to sustain their research and scholarship. Academic decision-makers and those directly involved in supporting research need "models for predicting the consequences of their actions" (Higbie, 1981, p. 45): a better understanding of how institutions respond to changes in their external research-support environment, and how the dynamic process of a university developing towards a research institution occurs.

A comprehensive, flexible field-study approach seems appropriate to the purposes of such a study. It can create a better understanding of the process of institutional responses to the phenomena under study. The ethnohistorical field-study approach is a powerful way to understand the phenomenon of organizational change and development from the perspective of the participants. It unfolds the meaning of what is important to the participants from within the setting. Through such an approach, based on informal interviews and document analysis, a deep, rich understanding of the phenomenon of institution responses can be obtained.

Conceptual Framework

An important functional characteristic of the field-study method is a preliminary review of relevant literature. This review of literature is used here to establish an initial conceptual framework to guide the study.

The conceptual framework initially selected was developed from the work of Katz and Kahn (1978) on internal regulation of organizational structures and environmental relationships in the study of organizations. Additional concepts are derived from the research of McCauley (1963) on the internal regulation of organizational structures and the control of the external environment by extending its boundaries, and from the work of Emery and Trist (1965) on understanding the competition for resources in an unstable environment and the formation of relationships like consortia. These authors helped establish the initial focus of the study and provided the "foreshadowed notions" (Malinowski, 1922) that guided the preliminary data collection and analysis. A more in-depth review of the literature, pertinent to each area being investigated and guided by the emerging data, proceeded concurrently with the field-research. The results of these literature reviews have been integrated with the data analysis and the generation of "grounded theory" (Glaser and Strauss, 1967) in Chapter IV of this study.

Data Collection

In utilizing qualitative research methodology for the study of organizations, it is important to employ a wide variety of data-collection techniques to ensure the flexibility necessary to gathering relevant data (Glaser and Strauss, 1967) and to assuring the validity and reliability of those data. The nature of the phenomenon under study lent itself to using the ethnohistorical approach described by Schumacher (1972) and Smith (1978). This approach focuses on "the accumulation of evidence about events in the past and their subsequent interpretation by the participants as part of a larger phenomenon" (Higbie, 1981, p. 47). The ethnohistorian attempts to go beyond the 'official' description of events and to include personal recollections, anecdotes, and quotations in an attempt to develop a vivid, provocatively-rich account of events. To accomplish this goal, a combination of qualitative research techniques commonly associated with the participant-observation approach (McCall and Simmons, 1969) was employed. By analyzing documents such as memoranda, desk logs, letters, written reports, telegrams, minutes of board meetings, and proposals, explicit knowledge was obtained and organized into a longitudinal, historical record that chronicled events leading to the University and the consortium-organization during a bounded period of time. Through informal interviews, the researcher obtained additional explicit information and "tacit knowledge" (Polyani, 1958) about those pre-verbal understandings of intutive experiential conceptions of events pertinent to the research effort. Prior personal participation in the formation of the Western Regional Scientific Laboratory, Inc., at the University of New Mexico and involvement in a preliminary study of related organizational changes made it possible for the researcher to obtain project documents, to gain access to key individuals associated with the institution and with the formation of the consortium, and to gain deeper insights into the nature of the phenomenon under investigation. The author spent seven months, the formative period of the consortium in 1976-1977, participating in activities as a member of a special staff brought together by member-institutions of the Intermountain University Research Administrators, under the direction of Dr. Paul Silverman, then Vice-President for Research and Graduate Affairs at the University of New Mexico. The objective of the staff was to assist IMURA and Dr. Silverman in establishing the Western Regional Scientific Laboratory, Inc., a consortium of Rocky Mountain and High Plains universities, and in researching and preparing a proposal for this consortium to manage the Los Alamos Scientific Laboratory when its contract with the University of California, Berkeley, expired in October, 1977. In addition, this author began the deliberate collection of project documents during the conduct of earlier preliminary studies. The first effort began in June and concluded in October, 1978.

The second pilot project began in January and concluded in May, 1981. The process of document collection continued throughout the present study, which was initiated in January and concluded in July, 1982. During these combined research periods, the author spent a substantial amount of time in the "field" at the University of New Mexico and at several other locations in Albuquerque, New Mexico, Denver, Colorado, and Orono, Maine, interviewing individuals and reviewing documents that were pertinent to the study.

Through this approach, which is described by Smith and Pohland (1972) as a "multi-method, multi-person, multi-situation, multi-variable matrix" (p. 11), opportunities became available to follow Iannaccone's "reiterative cycle" of definition (1975), data-collection, analysis and examination of concepts, and subsequent redefinition as need emerged from the data generated by this "disciplined inquiry" (Cronbach and Suppes, 1969).

A total of 1,742 pages of historically relevant documents were collected from the files of the University of New Mexico, the Western Regional Scientific Laboratory, Inc., and participants during the seventeen-month period when this study was conducted. File materials relating to the establishment of the Western Regional Scientific Laboratory, Inc., and the activities surrounding the preparation and submission of management proposals were provided by the Director and Assistant Director of Research Administration, the Secretary of the University of New Mexico, the former Vice-President for Research and Graduate Affiars, the former Project Director and Executive Secretary of the WRSL, Inc., the former Assistant Project Director of the WRSL, Inc., and the Associate Director of the Institute for Applied Research Services.

In addition, newspaper accounts, journal articles, and press releases concerning the establishment of WRSL, the preparation of the proposal, the activities of the University, and the responses of the Los Alamos Scientific Laboratory and the U. S. Energy Research and Development Administration to the WRSL were obtained from the files of the University of New Mexico. These were used to reconstruct the historical events under study.

These relevant historical documents proved to be a provocative source of information. The quantity of paper generated by the organization was as valuable as it was large. Its records provided the author with an additional avenue by which to observe how people posture, present, defend, react to, and initiate action inside the organization. Useful insights and corroborative data were obtained from this extensive paper trail. These documents were placed in chronological order, reviewed, analyzed, and coded for future access while they were being collected. Based on these documents and upon personal knowledge of the people and events described, a list of participants was prepared and interviews scheduled.

A total of ten individuals[1] was informally interviewed by the author. Each person interviewed gave written consent for use of the interview and data collected. These were to be used in the descriptive narrative of how the University of New Mexico adapted to changes in its environment and developed in the direction of a research institution. The interviews were intended to be directed but of moderate length. The moderately-scheduled interview was described by Stewart and Cash (1974) as containing "the major questions to be asked and possible probing questions under each major question." In addition, they observe, "[t]he moderately-scheduled interview does impose a degree of structure on the interview, forces a higher level of preparation, is easier to replicate and record answers, and is easier for an unskilled interviewer to conduct" (p. 81). The interviews were scheduled to last approximately two hours. This period of time was found to be of sufficient length to provide for unhurried "good conversation" (Rist, 1982, p. 8), during which time the author and the participant could explore a topic adequately. In instances where more than two hours were anticipated or found necessary, several interviews were planned or follow-up interviews were arranged. Each interview was tape-recorded and transcribed. Comments made by the author were taken in note-form and filed. When appropriate, additional comments were recorded on the transcriptions of the interviews. The interview-data were also analyzed and coded for access as they were transcribed. A number of new categories and redefinitions of categories emerged, expanding the author's perspective on the phenomena that were initially believed to be significant.

---

[1] Dr. William Davis, President of the University of New Mexico, declined to be interviewed, inasmuch as he was about to become Chancellor of the University System of the State of Oregon; time during his remaining tenure at the University of New Mexico was both short and in great demand.

In most qualitative studies, it is common practice to mask the identity of persons and places when developing the descriptive narrative. Rist (1982) notes that masking "becomes difficult as too much data is supplied" (p. 10) about people, events, and places. Moreover, a substantial amount of information concerning the background and setting of the study is customarily provided in a credible ethnographic study. Such information enables a determined individual to identify the research location. For all these reasons, in this study the author elected not to mask the identities of individuals or places.

The University of New Mexico's involvement in the establishment of a consortium of Rocky Mountain and High Plains universities, the Western Regional Scientific Laboratory, Inc., and its attempt to manage the Los Alamos Scientific Laboratory, all of which are described and analyzed in this study, are unique. For these reasons as well, it would be difficult to mask identities effectively. It was decided, therefore, to retain the identities of persons, places, and events with two provisions: (1) that a consideration fundamental to ethnographic research methodology be observed, i.e., that the author handle the data in a sensitive and thoughtful manner, and (2) that the author provide the individuals who participated in the events the opportunity to review and comment on the initial chapters of the study in which their names appeared and in which they were quoted. This process of review and comment by the participants, although adding an additional demand on time required for completion, also contributes to the study's validity. In addition, the decision not to attempt masking the reporting of data was based, in part, "on the recognition that the history being reported was generated by public officials" (Higbie, 1981, p. 49), who, in the performance of their duties, were "publicly accountable for the actions which it is [their] duty to perform" (Rainwater and Pittman, 1969, p. 87). However, discretion and the appreciation of the sensitive nature of the personal feelings and lives of those concerned in this study are perhaps a "less rigorous standard" (Higbie, 1981, p. 49) on which to base such a decision. It is, nonetheless, a fundamental and over-riding concern of those who utilize qualitative research techniques.

The following people, together with their titles during the 1967-1978 period under discussion, were interviewed: Dr. Paul Silverman, Associate Provost for Research and Academic Services; Mr. Edmund B. Kasner, Director of Research Administration; Mr. Milton Jenkins, Project Director; Colonel William Grant (ret.)., Assistant Project Director; Mr. L. E. Roberts, Associate Director of The Institute for Applied Research Services; Mr. Peter D. Rask, University Counsel; Dr. Ferrel Heady, President; Dr. Chester C. Travelstead, Provost; McAllister H. Hull, Jr., Provost, and Mr. John Perovich, Vice-President for Business and Finance. Those persons who were named or directly quoted in the study were given the opportunity to review and comment on the accuracy of the historical events reported. The following people who reviewed Chapters I and II signed a data-review and approval form indicating their satisfaction with the accuracy of the events reported: Dr. Paul Silverman, Mr. Edmund B. Kasner, Mr. Milton Jenkins, Colonel William Grant (ret.), Mr. L. E. Roberts, Dr. Ferrel Heady, Dr. Chester C. Travelstead, Dr. McAllister Hull, and Mr. John Perovich.

Data Analysis

An effort was made to correlate and analyze the data during the last seven-month period of this study. Categories developed as a result of preliminary studies were coded and examined for a "goodness of fit" (McCall and Simmons, 1969, p. 233), with new data emerging from interviews and documents during the last phase of the study. These categories were refined through constant comparison (Glaser and Strauss, 1967) between the original definitions and the emerging data.

The process of data collection and analysis was refined, focused, and directed through the process of "theoretical sampling" suggested by Glaser and Strauss (1967, p. 45). Preliminary categories were examined and redefined, and new categories and sub-categories were generated and tested throughout the study. Data that supported the emerging concepts were designated. By examining and comparing the contexts and concepts, probable relationships were formulated and examined. Through this process, several concepts emerged that were felt to be most applicable in illuminating the phenomena under study and substantially accounted for in the data. The emergent concepts were then elaborated and ordered in propositional form.

The manner in which the University of New Mexico adapted to changes in its environment and developed in the direction of a research institution during a period when federal research support had become more unstable and competition for research funds had increased was both multi-faceted and multi-dimensional; it was therefore necessary to explore and illuminate the relationships between the emerging concepts and the data within each of the categorical areas developed. To accomplish this, four longitudinal time-periods were identified and chronologically ordered: (1) the initial period of internal reorganization of the University's structure for research; (2) the period of informal and formal inter-organizational cooperation among members of the Intermountain University Research Administrators (IMURA); (3) the period of initial cognitive imaging of the new organization (WRSL, Inc.) and the shift to more active political involvement by the University of New Mexico in protecting the resource interests of the University, and (4) the period during which the

University participated in an attempt to incorporate a portion of its external research-support environment. These periods, although not chronologically exclusive, were indicative of the distinctive periods of development that emerged from the data and that were pertinent to the multi-faceted, multi-dimensional manner in which the University responded to environmental changes.

Generation of Theory

The development of "grounded theory", which attempts to explain how universities develop in the direction of research institutions, was the final outcome of the study. However, the immediate applicability of the theory should be reserved. Grounded theories emerge from limited ranges of data and are limited to contextual ranges of applications. The development of "special theories adequate to limited ranges of social data [rather than] . . . the search for all-inclusive conceptual schemes" (Merton, 1957, pp. 9-10) is of paramount importance in this study.

It should be emphasized "that the value of grounded-theory research rests not in the explicit statistical validation of existing theory but, rather, in the discovery of new understandings and insights as well as the development of data-based theory" (Blase, 1982, p. 110). This study does not assert that the grounded theory developed here will reflect the manner in which all institutions adjust to changes in their environment or the manner in which they will develop in the direction of graduate research institutions. Rather, it is based on the premise that understanding the response of one institution in one setting may contribute to the fundamental and general understanding of how institutions of higher education respond to their environment and pursue development into research organizations. Although the setting changes from one institution to another, it is suggested that the grounded theoretical framework developed here probably reflects elements that can contribute to a better understanding of how any university interacts with its environment and develops in the direction of a research institution. Indeed, the validity of such a proposition can be tested most adequately by engaging in a future empirical research effort that can build upon ideas generated in the emergent theory (Blase, 1982; Zetterberg, 1965).

The data-based or "grounded theory" was intially organized as a "set of determinants" (Zetterberg, 1965). As the data emerged and propositions were developed, the relationships suggested by each propositional statement were tested. These concepts and their correlation to organizational responses to external environmental change may be appropriately applied to a number of situations and there be contextually useful and predictive. Although the findings may be extrapolated for a more generalized application, the proposed theoretical explanation of the phenomenon studied had to be examined with respect to the threats to validity.

The sources of invalidity in document analysis and interviewing are treated cogently by Angell and Freedman (1953), Gottschalk (1965), and Webb, Campbell, Schwartz, and Secrest (1966). The sources of invalidity in both document analysis and interviewing were divided into three classifications: (1) errors originating in incidents or individuals being studied; (2) errors originating with the author; and (3) errors related to imperfections in the author's data sampling techniques. Although the author was aware of these threats to the validity to the document and interview data and made conscious efforts to control these sources of data invalidity, the length of time between the events and the study may have contaminated the data and therefore the author's conclusions. The memory of participants and author, over the intervening years, may have faltered; events may have been reported differently than they occurred. The passage of time, the retirement of the participants from the immediate events, associations with other participants, and the contextual milieu may have affected the views and perceptions of both the author and the participants interviewed. In retrospect, there were limited instances of inconsistency between the data obtained through interviews and through document analysis. More specific information, such as dates of events, the names of participants, and places was obtained through document analysis than through interviewing. However, the interview data complemented this information by providing recollections of reactions, perceptions, and interpreations of those same events.

Other variables in data-gathering are possible. The interviews were conducted over a six-month period; variance in the author's behavior could have occurred during this time. Too, the degree of attention to detail was substantially greater during the initial stages of the interviewing process than it was at the end. In many cases, the preponderance of mutually-confirming data caused the author's previous close attention to detail to become less rigorous.

Data-sampling as a source of error in this study was considered but set aside. Although the University of New Mexico was the organizational focus of the study, the events which occurred in response to the University's external research-support environment emerged as categorical sub-units of analysis. Data concerning these events were collected from participants, described, examined, defined, re-examined, redefined and compared before the conceptual categories were determined. These conceptual categories were the avant-couriers of the "grounded theory" which attempted to explain the phenomenon studied. The multi-method approach employed in this study deliberately sought to obtain the contextually-relevant perspectives of the participants both in documents and interviews during the period under study. It also tested the author's accuracy of observation by providing collaboration from the participants, who provided data or were quoted in the descriptive narrative review and comment on these chapters. The author applied an additional test: he continually consulted the relevant literature as the concepts emerged from the data. The utilization of a multi-method approach to data-collection and analysis contributed to "triangulating" (Campbell and Fiske, 1959; Rist, 1982) the data in a manner adequate to allay criticism concerning the validity of the study.

Although thorough and persistent efforts were made to identify statistical data on external support for University research, development and demonstration expenditures (RD&D) for 1967-1978, the data available in internal reports and documents were incomplete. In addition, the following limitations on the data are noted: (1) data on the number of proposal actions, the number of proposals funded, and total RD&D expenditures were not available for some years; (2) data on the number of proposal actions, the number of proposals funded, or total expenditures were not reported separately for federal, State, foundation, and corporate support, and (3) data on the number of proposal actions, the number of proposals funded, and total expenditures were not reported separately for research, demonstration, instruction, etc. The limitations of such data must be identified and their use qualified. Rather than placing an emphasis on the statistical data, these were used in combination with other documents and interview data as a means of observing some broad trends and gaining some general insights into the RD&D efforts on campus between 1967-1978.

Bibliography

BEST COPY AVAILABLE

BIBLIOGRAPHY

Ashworth, K. H. **Scholars and Statesmen: Higher Education and Government Policy**. San Francisco: Jossey-Bass, 1972.

Babbidge, D., Jr. "Reviews from the campus." In H. Orlans', **Science Policy and the University**. Washington, D.C.: The Brookings Institution, 1968.

Ben-David, J. **American Higher Education: Direction Old and New**. New York: McGraw-Hill, 1972.

Cheit, E. F. **The New Depression in Higher Education: A Study of the Financial Conditions in 41 Colleges and Universities**. New York: McGraw-Hill, 1971.

Corson, J. J. **The Governance of Colleges and Universities**. New York: McGraw-Hill, 1975.

Cowley, W. A. "Three Distinctions in the Study of Leaders." **Journal of Abnormal and Social Psychology**, April-June 1928, **23**, 144-157.

Dupree, A. H. **Science in the Federal Government: A History of Policies and Activities to 1940**. Cambridge, MA: The Belnap Press of Harvard University Press, 1957.

Emery, R. E., and Trist, E. "The Causal Texture of Organizational Environments." **Human Relations**, 1965, **18**, 21-31.

Filstead, W. J. "Qualitative Methods: A Needed Perspective in Evaluation Research." In T. D. Cook and C. S. Reichardt (Eds.), **Qualitative and Quantitative Methods in Evaluation Research**. Beverly Hills: Sage, 1979.

Finn, C. E., Jr. **Scholars, Dollars and Bureaucrats**. Washington, D.C.: The Brookings Institution, 1978.

Ford Foundation, The. **Research and the National Interest: A Report from Fifteen University Presidents**. Washington, D.C.: The Ford Foundation, 1978.

Gladieux, L. E. **Congress and the Colleges: The National Politics of Higher Education.** Lexington, MA: Lexington Books, 1976.

Glaser, B. G., and Strauss, A. **The Discovery of Grounded Theory**. Chicago: Aldine-Atherton, 1967.

Handler, P. "Science and Government: Opportunities and Conflicts." In F. Seitz (Ed.), **Science, Government and the Universities.** Seattle: University of Washington Press, 1966.

Heimovicks, R. D. "Federal Support of University Research and Development." In T. P. Murphy (Ed.), Science, Geopolitics and Federal Spending. Lexington, KY: Heath Lexington Books, 1971.

Hornig, D. A. "Look Ahead." In F. Seitz (Ed.), Science, Government and the Universities. Seattle: University of Washington Press, 1966.

Katz, D., and Kahn, R. L. The Social Psychology of Organizations (2nd Ed.). New York: John Wiley and Sons, 1978.

Kidd, C. V. American Universities and Federal Research. Cambridge, MA: The Belnap Press of the Harvard University Press, 1959.

Klopsteg, P. E. "Support of Basic Research from Government." In D. Wolfle (Ed.), Symposium on Basic Research. Washington, D.C.: American Association for the Advancement of Science, 1959.

Lofland, J. Analyzing Social Settings. Belmont, MA: Wadsworth Publishing, 1971.

Millet, J. D. Financing Higher Education. New York: Columbia University Press, 1952.

Murphy, T. P. Science, Geopolitics and Federal Spending. Lexington, KY: Heath Lexington Books, 1971.

Nagi, S. Z., and Corwin, R. G. The Social Contexts of Research. New York: Wiley-Interscience, 1972.

National Science Foundation. A Report to the President and Congress: Federal Support to Universities, Colleges and Selected Non-Profit Institutions, Fiscal Year 1978. Washington, D.C.: U.S. Government Printing Office, 1978.

Orlans, H. (Ed.). Science: Policy and the University. Washington, D.C.: The Brookings Institution, 1968.

Polyani, M. The Study of Man. London: Routledge and Kegan Paul, 1958.

Price, D. K. The Scientific Estate. Cambridge, MA: The Belnap Press of Harvard University Press, 1965.

Rist, R. C. On Qualitative Research Issues of Design, Implementation, Analysis, Ethics, Applicability. Unpublished paper, New York, March 1982.

BEST COPY AVAILABLE

Rivilin, A. M. The Role of the Federal Government in Financing Higher Education. Washington, D.C.: The Brookings Institution, 1961.

Schumacher, S. Ethnohistorical Research: A Comparison of Two Qualitative Approaches to Inquiry. St. Louis: Washington University, 1972 (mimeographed).

Seitz, F. (Ed.). Science, Government and the Universities. Seattle: University of Washington Press, 1966.

Smith, B. L., and Karlesky, J. The State of Academic Science: The Universities in the Nation's Research Effort. New York: Change Magazine Press, 1977.

Smith, L. M. "An Evolving Logic of Participant Observation, Educational Ethnography and Other Case Studies," In L. Shulman (Ed.), Review of Research in Education (Vol. 6). Itasca, IL: F. E. Peacock Publishers, 1978.

Stake, R. "The Case Study Method in Social Inquiry." Educational Researcher, 1978, 7, 6-9.

Strickland, S. (Ed.). Sponsored Research on American Universities and Colleges. Washington, D.C.: American Council on Education, 1967.

Tuckman, H. P., and Whalen, E. Subsidies to Higher Education: The Issues. New York: Praeger Publishers, 1980.

Veysey, L. R. The Emergence of the American University. Chicago: University of Chicago Press, 1965.

Wolfle, E. (Ed.). Symposium on Basic Research. Washington, D.C.: American Association for the Advancement of Science, 1959.

BEST COPY AVAILABLE